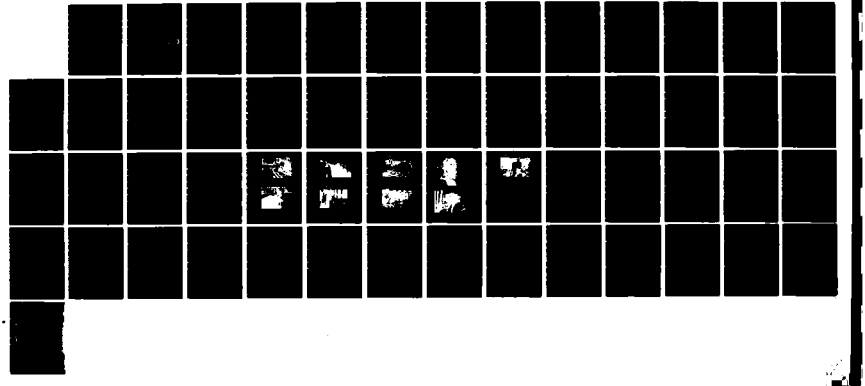
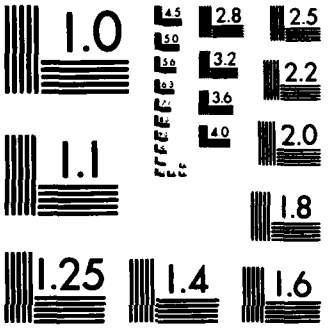
AD-A142 830 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 1/1
SUCCESS LAKE DAM (CT.. (U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV MAY 81

UNCLASSIFIED F/G 13/13 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00079	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Success Lake Dam Conn. Coastal Basin, Bridgeport, Conn. NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE May 1981 13. NUMBER OF PAGES 50
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

DTIC ELECTE JUL 2 1984 S D A

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Success Lake Dam
Conn. Coastal Basin
Bridgeport, Conn.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Success Lake Dam, constructed in 1875, is a 132 ft. long, 17 ft. high structure composed of two earthfill embankments and a central 33 ft. long broad crested spillway. The original timber spillway decking has since been capped with concrete There is a small single land bridge, across the overflow spillway section. Flow over the spillway is channeled through five 4 ft. wide, 2 ft. high openings, and one 3.3 ft. wide, 2 ft. high, opening formed by the bridge piers. The upstream concrete face of the spillway has a slope of approx. 2H:1V and the masonry downstream face is vertical.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

84 06 29 073

AD-A142 830

DTIC FILE COPY

SUCCESS LAKE DAM

CT 00079

CONNECTICUT COASTAL BASIN

BRIDGEPORT, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

MAY 1981

CONSULTING
ENGINEERS

INTERNATIONAL ENGINEERING COMPANY, INC.
A MORRISON-KNUDSEN COMPANY

EASTERN DISTRICT OFFICE
777 POST ROAD DARIEN, CONNECTICUT 06820
PHONE (203) 655-3345

11410
2616-110

May 7, 1981

Mr. E. P. Gould
Project Management Branch
Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Reference: Contract No. DACW33-81-C-0015
Inspection and Evaluation of Non-Federal Dams
FY-81, Southwestern Connecticut

Dear Mr. Gould:

The inspection of Success Lake Dam and subsequent hydrologic-hydraulic investigation revealed that the dam should be classified as having a low hazard potential. The following is an abbreviated Phase I Inspection report to substantiate this classification.

Sincerely,

Reynold A. Hokenson

Reynold A. Hokenson, P. E.
Project Manager

RAH:mem

Enclosures

TABLE OF CONTENTS

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification No: CT 00079

Name of Dam: Success Lake Dam

Town: Bridgeport

County and State: Fairfield, Connecticut

Stream: Yellow Mill Channel

Dates of Inspection: February 5 and 19, 1981

BRIEF ASSESSMENT

The Success Lake Dam impounds Success Lake on the Yellow Mill Channel tributary in Bridgeport, Fairfield County, Connecticut. The structure is currently owned by Remington Arms Company, Inc., 939 Barnum Avenue, Bridgeport, Connecticut. The operation of the facility is the responsibility of Robert H. Gruss, Plant Engineer, Remington Arms Co., Inc., (203) 333-1112. Currently, the impoundment is maintained for aesthetics and wildlife conservation.

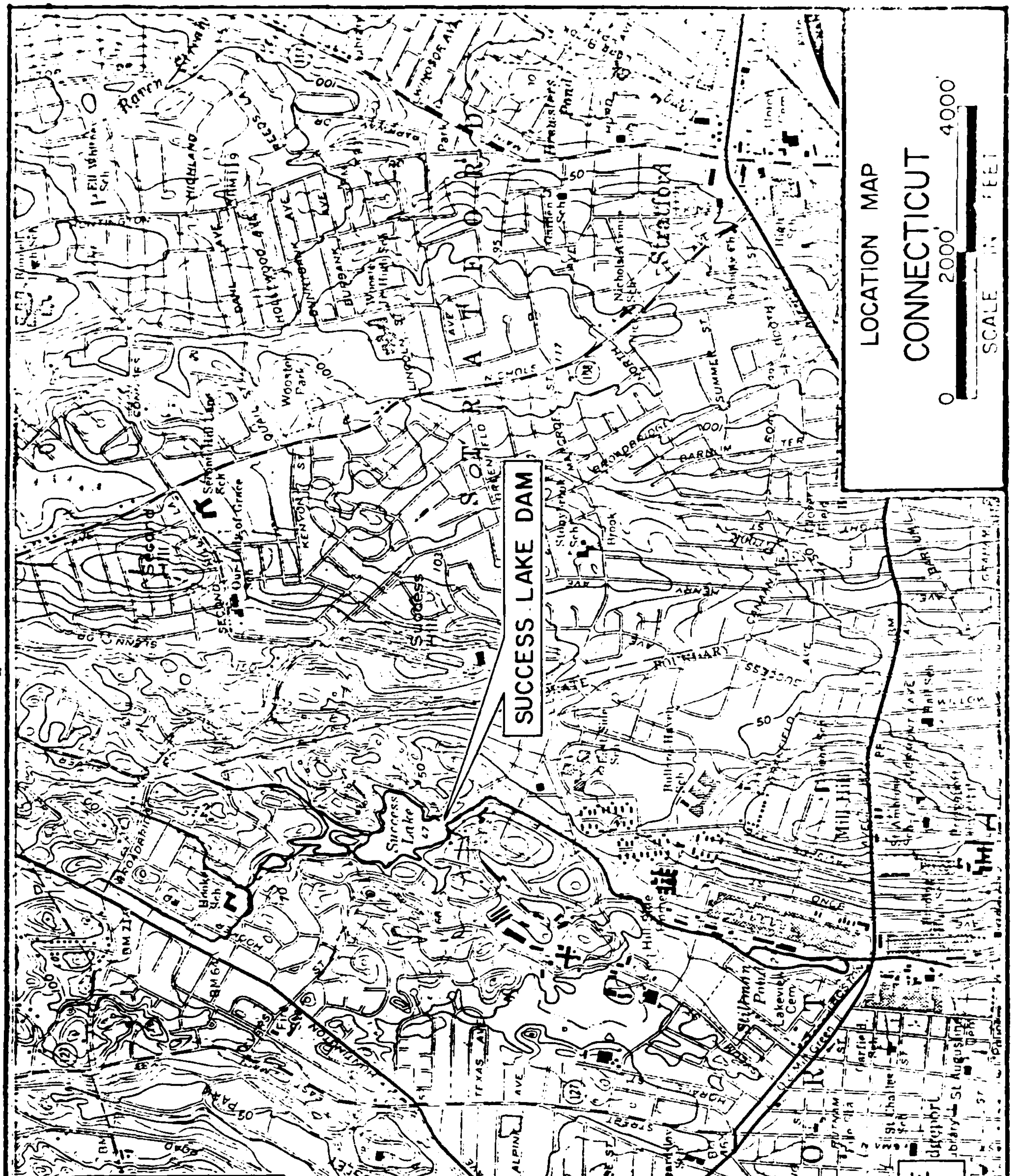
The Success Lake Dam, constructed in 1875, is a 132-foot-long, 17-foot-high structure composed of two earthfill embankments and a central 33-foot-long broad crested spillway. The original timber spillway decking has since been capped with concrete. There is a small single land bridge, across the overflow spillway section (Photo 1). Flow over the spillway is channeled through five 4-foot-wide, 2-foot-high openings, and one 3.3-foot-wide, 2-foot-high, opening formed by the bridge piers. The upstream concrete face of the spillway has a slope of approximately 2H:1V and the masonry downstream face is vertical. The downstream slopes of the two-side embankments are formed by vertical stone retaining walls. The upstream slopes also appeared to be vertical stone retaining walls, however, these areas were, for the most part, concealed beneath the water surface and accumulated sediments (Photos 2 and 3).

Two cast [illegible] conduits pass through the earthfill embankment at the right abutment of the dam and provide additional outlets from the impoundment. A 14 inch diameter conduit exits the dam near its base approximately 12 feet from the right side of the spillway. Discharges from this conduit are regulated by a hand operated valve which is housed in a small masonry structure (Photo 9). The second conduit is 8 inches in diameter and emerges from the right embankment, approximately 5 feet below the top of the dam and about 25 feet from the spillway (Photo 7). This conduit extends 126 feet downstream to a small brick structure where, at one time, it provided water for the generation of steam (Photo 8). The brick structure formerly housed equipment for the generation and distribution of steam to the various industrial processes that were performed by Remington Arms Company, Inc., in the 1940's. This equipment was removed from the site and the building was converted to an employee locker room. The 8-inch conduit leading to this building, though deteriorated, is still intact.

Visual inspection of the site indicated that the dam is in poor condition. The inspection revealed the following: deterioration of the vertical downstream face of the spillway, cracked and missing portions of the concrete spillway crest along the downstream edge (Photo 4), cracks along the upstream and downstream interfaces of the spillway and abutments, exposed aggregate on the concrete spillway cap, seepage along the toe of the left embankment has resulted in a 20-foot by 30-foot marshy area approximately 40 feet from the dam, and a potentially inoperable low-level outlet. The seepage beneath the spillway, described in the inspection report submitted by William P. Sanders of the State of Connecticut Water Resource Commission on July 22, 1964 (see Correspondence), was not confirmed during the inspections con- ducted by IECO on February 2 and 19, 1981. During these inspections, an accumulation of rocks at the base of the spillway, ice formations on the downstream face of the spillway and particularly water flowing over the spillway made it impossible to examine this portion of the dam closely (Photos 5 and 6). Water was observed draining vertically through cracks in the concrete cap near the left upstream spillway abutment, but no corresponding of discharge was noted on the downstream

face of the spillway. In addition, localized outward movement of the stone retaining wall and the concrete spillway cap were also found in the vicinity of the left spillway abutment. The effected area is approximately 7 feet wide, but the movement has been slight and is a local condition not threatening the dam.

The Success Lake Dam has a maximum potential storage capacity of 119 acre-feet (ac-ft) and is approximately 17 feet in height. Since the dam falls within the Corp's criteria for the small size category based on storage (between 50 and 1,000 ac-ft), the dam is considered to be SMALL in size. The dam breach analysis was conducted in accordance with the "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", dated April 1978, and the potential impact area was defined. Failure of the dam would cause the water surface within the streambed immediately down- stream of the dam to rise from 4.7 feet at a prefailure outflow of 310 cfs to 11.1 feet at an outflow of 2,360 cfs. The first floor of the brick structure located approximately 130 feet downstream from the dam is more than 20 feet above the streambed, and this will not be effected by the flood wave. The only remaining other structures adjacent to the Yellow Mill Channel are located 3,500 feet downstream from the dam. These will sustain little or no damage since the water surface within this reach will rise only 1.8 feet above the streambed. Since failure of the dam will cause little or no property damage and no loss of life, the dam has been classified as having a LOW hazard potential.


SUCCESS LAKE DAM
LOCATION MAP
CONNECTICUT
0 2000 4000
SCALE IN FEET
USGS QUADRANGLE
BRIDGEPORT 1970
CONNECTICUT
QUADRANGLE LOCATION

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Success Lake Dam

DATE 02/5 & 19/81

TIME 10:00 a.m.

WEATHER Sunny, Cold

W.S. ELEV. 47.1

PARTY:	INITIALS:
1. Jeffrey T. Klaucke	JK
2. Myron B. Petrovsky	MP
3. Ernst H. Buggisch	EB
4. Paul Archer	PA
5. Harold Farnham	HF (Matthews Associates)

PROJECT FEATURE:	INSPECTED BY:
1. Dam	JK, MP, EB, PA
2. Intake Channel	JK, MP
3. Valvehouse	JK, HF, MP
4. Powerhouse Conduit	HF, JK, MP
5. Low Level Outlet	HF, JK, MP
6. Low level Outlet Channel	JK, MP, EB, PA
7. Spillway	JK, MP, EB
8. Bridge	JK, PA, EB

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Dam NAME: JK, MP, EB, PA

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	47.0
Current Pool Elevation	47.1
Maximum Impoundment to Date	Approximately 50.0
Surface Cracks	None
Pavement Condition	Good
Movement or Settlement of Crest	None
Lateral Movement	Local movement on upstream face near left spillway abutment.
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Cracks along U/S and D/S interfaces with spillway.
Indications of Movement of Structural Items on Slopes	Minor bulging of U/S and D/S retaining walls.
Trespassing on Slopes	None.
Sloughing or Erosion	None
Rock Slope Protection	The exposed U/S walls were irregular and missing stones.
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	Wet area at D/S toe on the left bank. Seepage noted through valvehouse.
Piping or Boils	Possible piping along low level outlet conduit.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Dam (Continued) NAME: JK, MF, EB, PA

AREA EVALUATED	CONDITION
Foundation Drainage Features	Unknown
Toe Drains	Unknown
Instrumentation System	None

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Intake Channel NAME: JK, MP

AREA EVALUATED	CONDITION
OUTLETS WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Success Lake
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	No structure visible above current pool level.
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Valvehouse NAME: JK, HF, MP

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	Fair, wooden roof rotted.
Condition of Joints	Good
Spalling	None
Visible Reinforcing	None
Rusting or Staining of Concrete	Near crack in valvehouse wall
Any Seepage or Efflorescence	Seepage noted through crack in valvehouse wall.
Joint Alignment	Good
Unusual Seepage or Leaks in Gate Chamber	None
Cracks	Right wall of valvehouse
Rusting or Corrosion of Steel	Exposed portion of low level outlet conduit.
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Mechanical Valve	Not tested at owner's request
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Low level Outlet NAME: HF, JK, MP

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Conduit	Fair
Rust or Staining on Conduit	Superficial rust on exposed conduit.
Spalling	N/A
Erosion or Cavitation	None
Cracking	None
Alignment of Monoliths	N/A
Alignment of Joints	N/A
Numbering of Monoliths	N/A
	Note: Only a small portion of the cast iron conduit (approximately 8 in.) was visible.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Low Level Outlet Channel NAME: JK, MP, EB, PA

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	N/A
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain holes	
Channel	
Loose Rock or Trees Overhanging Channel	Large rocks and 5 to 20 in. diameter trees were found immediately D/S of the outlet and adjacent to the spillway discharge channel.
Condition of Discharge Channel	Large rocks have accumulated on the channel floor.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Spillway NAME: JK, HF, EB

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Success Lake
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Masonry	Loose stones in retaining walls, some stones missing and wall movements noted near spillway.
Rust or Staining	None
Spalling of spillway concrete cap	Near downstream edge of spillway weir.
Any Visible Reinforcing	None
Any Seepage	Some vertical drainage into dam through cracks in the spillway cap.
Drain Holes	None
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	Loose rocks from downstream walls of spillway have accumulated in discharge channel.
Trees Overhanging Channel	Large tree on right bank between valvehouse and spillway.
Floor of Channel	Strewn with large rocks.
Other Obstructions	None

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Bridge NAME: JK, PA, EB

AREA EVALUATED	CONDITION
OUTLET WORKS - BRIDGE	
a. Super Structure	
Bearings	N/A
Anchor Bolts	N/A
Bridge Seat	N/A
Longitudinal Members	N/A
Under Side of Deck	Good
Secondary Bracing	None
Deck	Good
Drainage System	All 3 inch diameter drains in curbs were free of obstructions.
Railings	Good
Expansion Joints	None
Paint	N/A
b. Piers	
General Condition of Concrete	Good
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	
	Note: The bridge is supported 2 feet above the spillway by 4 concrete piers that are founded on the spillway.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Powerhouse Conduit NAME: JK, HF, MP

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	N/A
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Effloresence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Mechanical Valve	Valve inoperable, conduit has not been used since the 1940's.
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

APPENDIX B

ENGINEERING DATA

SUMMARY OF DATA AND CORRESPONDENCE

No. _____

Inventoried By _____

Date _____

WATER RESOURCES UNIT
SUPERVISION OF DAMS
INVENTORY DATA

Lat: 41° 12.3'
Long: 73° 9.9'

Name of Dam or Pond SUCCESS LAKE

Code No. _____

Nearest Street Location Huntington Turnpike

Town Bridgeport

U.S.G.S. Quad. Bridgeport

Name of Stream Unnamed

Owner Remington Arms Company, Inc.

Address Barnum Avenue
Bridgeport, CT

Pond Used For Fire Protection Drainage Area 2.43 sq. mi.

Dimensions of Pond: Width 700' Length 1100' Area 18.3 ac.

Total Length of Dam 125' Length of Spillway 35'

Location of Spillway Center of dam

Height of Pond Above Stream Bed 15'

Height of Embankment Above Spillway 3'

Type of Spillway Construction Concrete cap

Type of Dike Construction Masonry

Downstream Conditions Bridgeport

Summary of File Data _____

Remarks _____

Would Failure Cause Damage? _____ Class _____

NEW YORK LICENSE 4755
CONNECTICUT REGISTRATION 4

JOSEPH W CONE
CIVIL ENGINEER
124 HAVEMEYER PLACE
GREENWICH, CONNECTICUT
06830

TELEPHONE
TOWNSEND 9-2152

June 7, 1966

Mr. William H. O'Brien III
Water Resources Commission
State Office Building
Hartford 15, Conn.

Re: Dam #46 Stillman Pond-Bdpt.
AND SUCCESS LAKE DAM

Dear Mr. O'Brien:

As requested, I have inspected the Stillman Pond Dam and the tributary watershed. Also permission was obtained from Remington Arms office to inspect Success Lake Dam, being escorted by one of their guards, since the condition of this dam is involved with Stillman.

	Success	Stillman
Watershed	2.28 sq.mi.	3.44 sq. mi.
Peak Q pres 100 yr	1250 cfs	1890 cfs
" " 2000 AD 400 yr	4370 "	5130 "

Both dams are solidly constructed and, in my opinion, will not fail but both will be overtopped in the future. Both have very low headroom, Success 6 openings averaging 4'x2'; openings were not measured at Stillman, it was evident that dam is safe although it will be overtopped.

Tracks serving the G.E. Plant will be flooded in the future during a severe storm due to channel of inadequate capacity.

Copies of work sheets, three photos and map of watersheds are enclosed. See Lake Forest for more applicable data.

My recommendation is that your office suggest to Remington Arms and General Electric that there be a standing order that their maintenance men see to it that openings at dams be kept clear of debris during heavy storms, this to reduce frequency of overtopping.

Very truly yours,

J. W. Cone

JWC/dr
Enc: 6

[illegible]

[illegible]

FOREST 925 Ac — 1.445 sq. mi [illegible]
25 yr [illegible]

(Chart B) Q Peak = 850 cfs [illegible] 1950

Entire shed developing rapidly. Rolling terrain. — Control 1.08

Q present 25 yr = RF × LF × FF × Q — cfs/Ac

	= 1 × 0.8 × 1 × 850	= 680 cfs	0.73
Q " 100 yr	= 1 × 0.8 × 1.8 × 850	1220	1.32
Q " 400 yr	= 1 × 0.8 × 3.8 × 850	= 2580	2.8
" 2000 AD "	= 1 × 1.0 × 3.8 × 850	= 3240	3.5

Compare 3240 with 1955 Floods 1.5 sq. mi on $Q = 5000\sqrt{A}$ = 6150 cfs.
= 6000 on 1.445

SUCCESS 1460 Ac — 2.28 sq mi

Entire area developing rapidly except 132 Ac occupied by [illegible]

Rolling terrain rather flat

Chart B Q = 1150 cfs — Control .685

Q pres. 25 yr = RF × LF × FF × Q

	= 1 × 0.6 × 1 × 1150	= 690 cfs	0.47
" 100	= 1 × 0.6 × 1.8 × 1150	1250	0.85
" 400	= 1 × 0.6 × 3.8 × 1150	2620	1.8
2000 AD "	= 1 × 1.0 × 3.8 × 1150	4370	3.0

Provided Pam [illegible] controls large area.

[illegible] 2200 Ac — 3.44 sq. mi. Chart B Q = 1500 — Control .455

Q pres 25 yr = RF × LF × FF × Q — cfs/Ac

	= 1 × 0.7 × 1 × 1500	= 1050	0.48
" 100	= 1 × 0.7 × 1.8 × 1500	1890	0.86
" 400	= 1 × 0.7 × 3.8 × 1500	4000	1.8
2000 AD "	= 1 × 0.9 × 3.8 × 1500	5130	2.3

Provided Pam Areas of G.E. do not [illegible] 330 Ac

J.V.C. 5/8

(A)

Forest & Stillman

5/4/66

Lake Forest #25

Watershed | Lake Area

580 / 2.55 / 5.775 — Cal. 5.78 sq.mi / 1.443 sq mi / 925 Ac

.42 / 4.42 / .105 sq mi / 67 Ac

Storage Ratio 1:14 Fair

Lake Success above Stillman

Watershed | Lake Area

9.13 | 0.18
18.24 | 0.46
4 | 9.12 | 4 | 1.53
2.28 sq mi | .038 sq mi
1460 Ac | 24 Ac

Storage Ratio 1:61 Very Poor

Drained by Bear Area trib to Success

4 | .82
.205 sq mi 132 Ac

Stillman Pond below Success

Total Watershed | Lake Area

4.70 | 0.05

Storage Ratio 1:83 Very Bad practically 0

Drained by Bear Area & G.E. trib to Stillman including trib To Success

4 | 2.06
.515 330 Ac.

TOTAL Stillman #46 (includes Success)

Watershed | Lake Storage

Lenshed 3.15 mi
Available 1.1 mi

13.76
27.55
4 | 13.77
3.44 sq.mi
2200 Ac

1460
750
2210 Check

Success 24 Ac
Stillman 9
Total 33 Ac

Total Storage Ratio 1:67 Very poor

(B)

Remington DUPONT

REMINGTON ARMS COMPANY, INC.

PETERS DUPONT

MANUFACTURERS OF
SPORTING FIREARMS, AMMUNITION
TRAPS TARGETS
POWER TOOLS

ARMS AND CARTRIDGE POWERED TOOLS
ILION, N. Y.
AMMUNITION, BRIDGEPORT, CONN.
POWER TOOLS, PARK FOREST, ILL.

BRIDGEPORT 2, CONNECTICUT

PETERS CARTRIDGE DIVISION
BRIDGEPORT, CONN
TRAPS AND TARGETS, FINDLAY, OHIO
CABLE – HARTLEY, BRIDGEPORT
– ALL CODES –

October 9, 1964

SUCCESS LAKE DAM
BRIDGEPORT

State of Connecticut
Water Resources Commission
State Office Building
Hartford 15, Connecticut

Attention Mr. William P. Sander, Engineer-Geologist

Gentlemen:

Reference - Your letter of July 22, 1964

The leakage under the spillway is a condition we are aware of and have been checking periodically. There is no apparent increase in the water flow over the past ten years and we, therefore, feel this is not a condition to cause concern. The massive construction of this dam should be adequate if the leaks do not become larger, or general deterioration set in.

We have a periodic inspection set up whereby the quantity of water leaking is measured and checked against previous findings. Any increase will be readily recognized and prompt remedial action will be taken.

The trees specified in your report have been removed.

Very truly yours,

REMINGTON ARMS COMPANY, INC.
H.M. PIERCE, JR., WORKS MANAGER

J. P. Barry
Works Engineer

JPB:O'L

B-6

July 22, 1964

Mr. H. M. Pierce, Jr., Plant Manager
Remington Arms Company, Inc.
Barnum Avenue
Bridgeport, Connecticut

Dear Sir:

The Water Resources Commission has recently completed an inventory of all the dams in the Town of Bridgeport.

During the inventory, the dam forming Success Lake was inspected and was found to be in need of repair. At the date of the inspection, all stream flow was through leakage under the spillway. In addition, the trees which are growing on the dam should be removed. These points are not critical at the present time but represent a condition which could lead to failure of the dam.

We would appreciate hearing what plans you have to place this structure in a safe condition.

Very truly yours,

William P. Sander
Engineer - Geologist

WPS:js

STATE	IDENTITY NUMBER	DIVISION	STATE	COUNTY	CONGR DIST.	STATE	COUNTY	CONGR DIST.	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY | MO | YR
CT	79	NED	CT	001	04				SUCCESS LAKE DAM	4112.3	7309.9	10DEC73

POPULAR NAME	NAME OF IMPOUNDMENT
	SUCCESS LAKE

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	DIST FROM DAM (MI.)	POPULATION
01	07	TR-YELLOW MILL CHANNEL	MILL HULL	1	250000

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUC. HEIGHT (FT.)	HYDRAU. HEIGHT (FT.)	IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)
CH	1875	O	18	17	124	109

DIST UHN FED R PHV/FED SCS A VEH/DATE
NED

REMARKS
20-ESTIMATE 22-ESTIMATE

D/S HAS	SPILLWAY CREST LENGTH	SPILLWAY TYPE	SPILLWAY WIDTH (FT.)	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
	125		35													

OWNER	ENGINEERING BY	CONSTRUCTION BY
REMINGTON ARMS		

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE

INSPECTION BY	INSPECTION DATE DAY | MO | YR	AUTHORITY FOR INSPECTION
DEPT ENV PROT	03NOV72	PA 571 SECT 25-11 ST OF CT

REMARKS

CALL to reserve clearance. on days notice.
Bob Gruss Ext 1316.

REPORTS CONTROL SYMBOL
OAEN-CWE-17

Letter approx. time & date
2 weeks

APPENDIX C

PHOTOGRAPHS

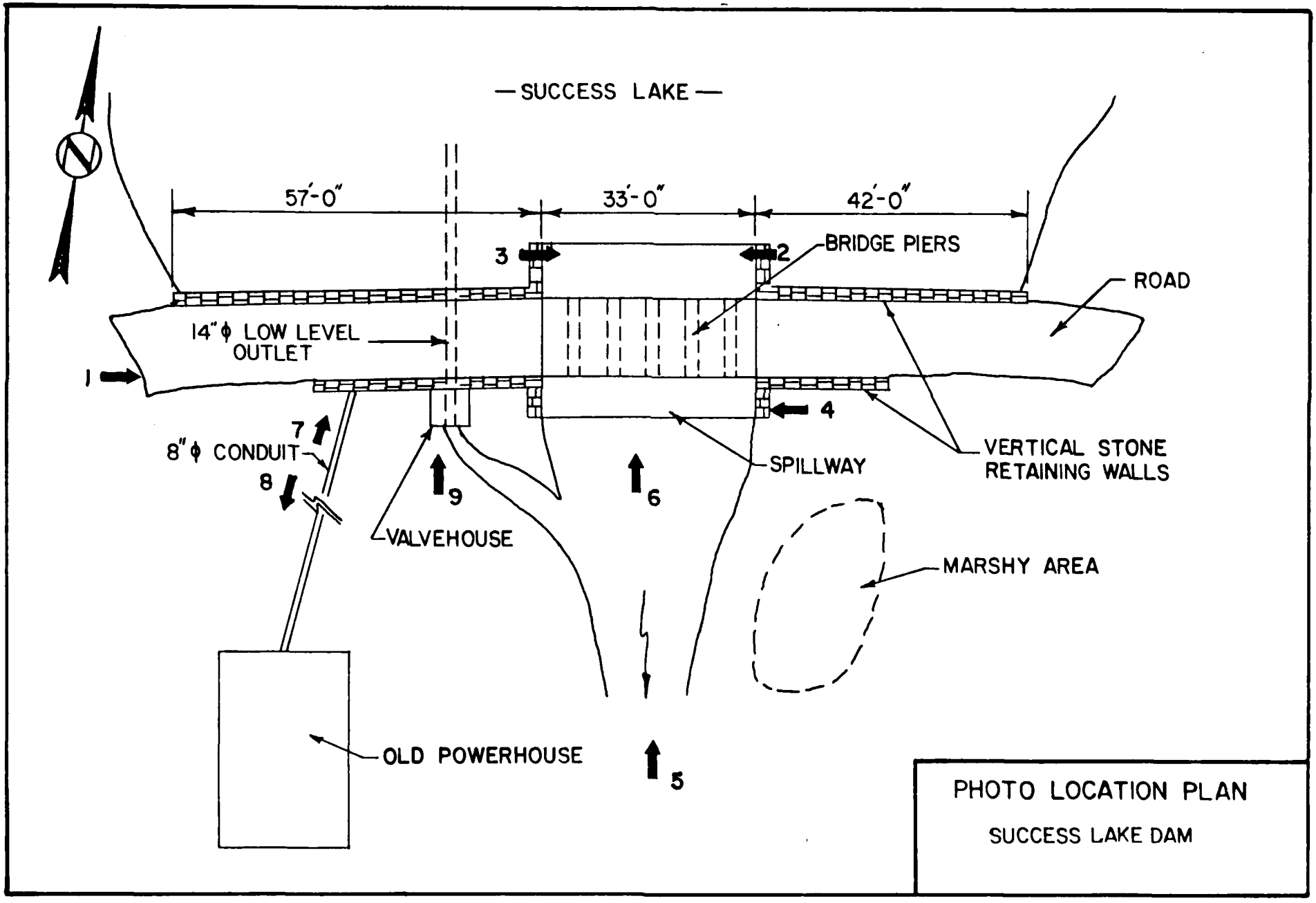

— SUCCESS LAKE —
57'-0"
33'-0"
42'-0"
BRIDGE PIERS
ROAD
14" ϕ LOW LEVEL OUTLET
1
2
3
4
5
6
7
8
9
8" ϕ CONDUIT
VALVEHOUSE
SPILLWAY
VERTICAL STONE RETAINING WALLS
MARSHY AREA
OLD POWERHOUSE
PHOTO LOCATION PLAN
SUCCESS LAKE DAM

Photo 1 Top of dam and single lane road.

Photo 2 Upstream face of dam, spillway crest and right dam embankment.

Photo 3 Upstream face of dam, spillway crest and left dam embankment.

Photo 4 Downstream spillway crest and bridge piers.

Photo 5 Downstream face of dam.

Photo 6 Downstream masonry face of spillway.

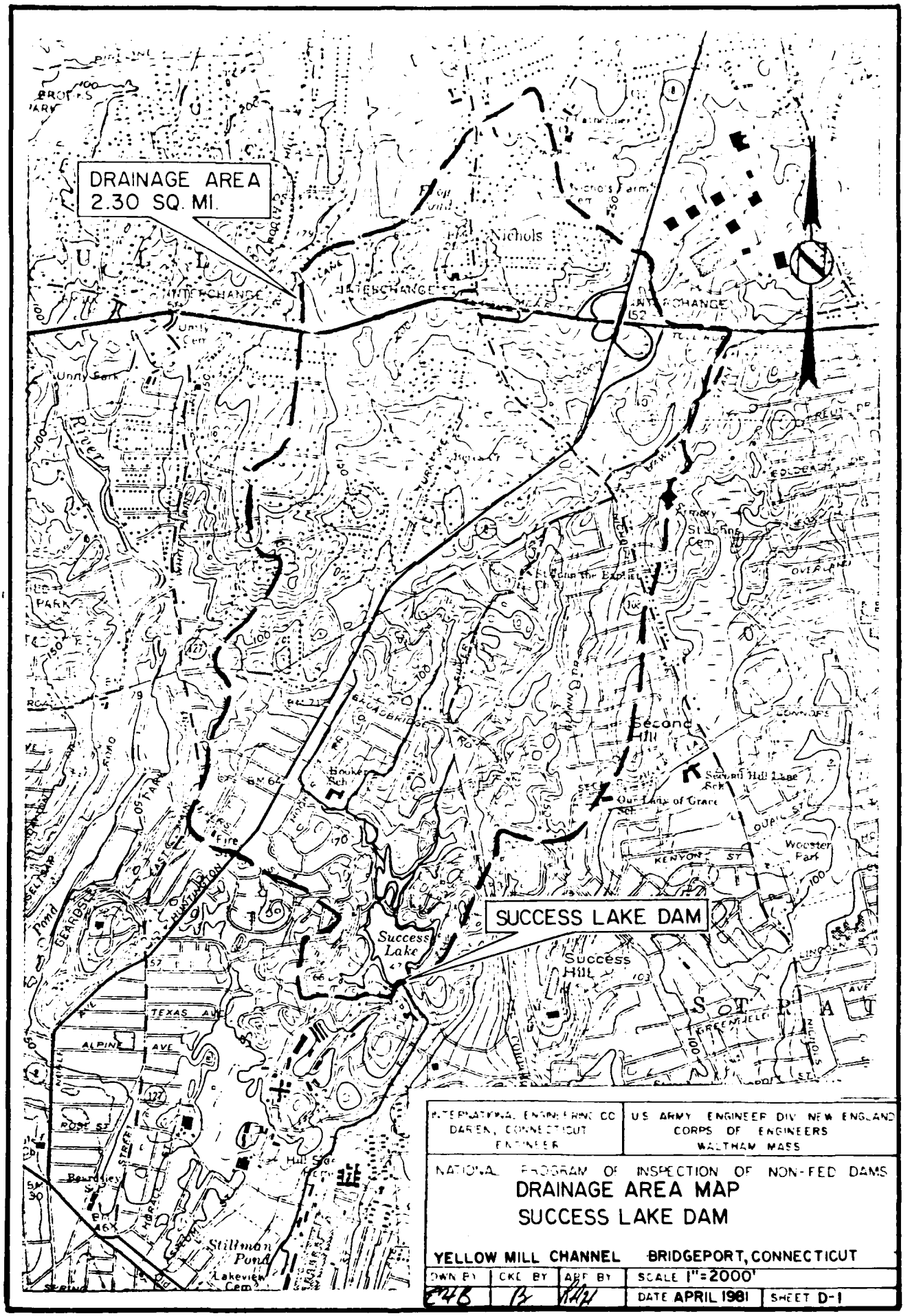
Photo 7 Downstream masonry face of right dam embankment, 8 inch diameter conduit and control valve.

Photo 8 Brick structure and 8 inch diameter conduit.

Photo 9 Low-level outlet and valvehouse.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS



INTERNATIONAL ENGINEERING CO DAREN, CONNECTICUT ENGINEER	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

DRAINAGE AREA MAP
SUCCESS LAKE DAM

YELLOW MILL CHANNEL BRIDGEPORT, CONNECTICUT

DWN BY	CKD BY	APP BY	SCALE 1"=2000'	
EAB	B	RHH	DATE APRIL 1981	SHEET D-1

HYDRAULIC / HYDROLOGIC INSPECTION

SUCCESS LAKE DAM, BRIDGEPORT, CT CT00079

I. PERFORMANCE AT PEAK FLOOD CONDITIONS

1. MAXIMUM PROBABLE FLOOD

a. WATERSHED CLASSIFIED AS "ROLLING"

b. WATERSHED AREA (D.A.) = 2.30 SQ. MI. *

* FROM IECO MEASUREMENTS ON THE BRIDGEPORT USGS QUADRANLE MAP, CT. FROM U.S. CORPS OF ENGINEERS (ACE) DATA, D.A IS 2.43 SQ. MI.

c. EXTRAPOLATING FROM NED-ACE GUIDE CURVES

$$PMF \cong 2080 \text{ CFS / SQ. MI.}$$

d. THEREFORE, PEAK INFLOW:

$$PMF = 2080 \times 2.3 \cong 4780 \text{ CFS}$$

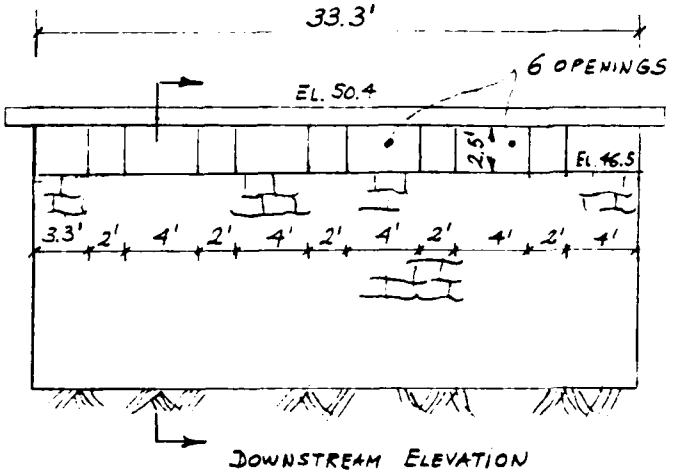
$$\tfrac{1}{2} PMF \cong 2390 \text{ CFS}$$

2. SURCHARGE AT PEAK INFLOWS (PMF AND 1/2 PMF).

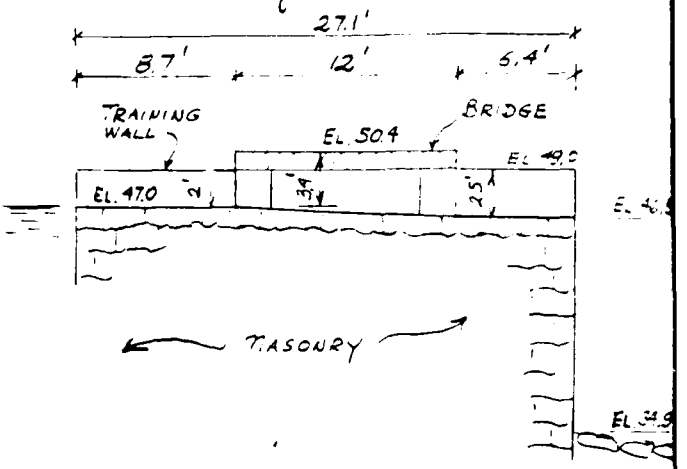
a. OUTFLOW RATING CURVE

i. SPILLWAY

THE MASONRY SPILLWAY IN THE MID-SECTION OF SUCCESS LAKE DAM IS A BROAD-CRESTED WEIR WITH A VERTICAL DOWNSTREAM FACE (SEE SKETCHES ON P. D-2).



DOWNSTREAM ELEVATION



CROSS-SECTION

THE 33.3-FT-WIDE AND 27.1-FT-LONG SPILLWAY HAS A CONCRETE ROAD BRIDGE WITH 6 OPENINGS THE FIVE OF WHICH HAVE A WIDTH OF 4 FT AND THE ONE OPENING ON THE RIGHT SIDE IS A 3.3-FT WIDE. THE HEIGHT OF THE OPENINGS IS 2 FT ON THE UPSTREAM BRIDGE EDGE AND 2.5 FT ON THE DOWNSTREAM EDGE. THE TOTAL LENGTH OF THE OPENINGS IS 23.3 FT (L_o) AND THE TOTAL AREA OF THE OPENINGS ON THE UPSTREAM SIDE IS 46.6 SQ. FT (A_o).

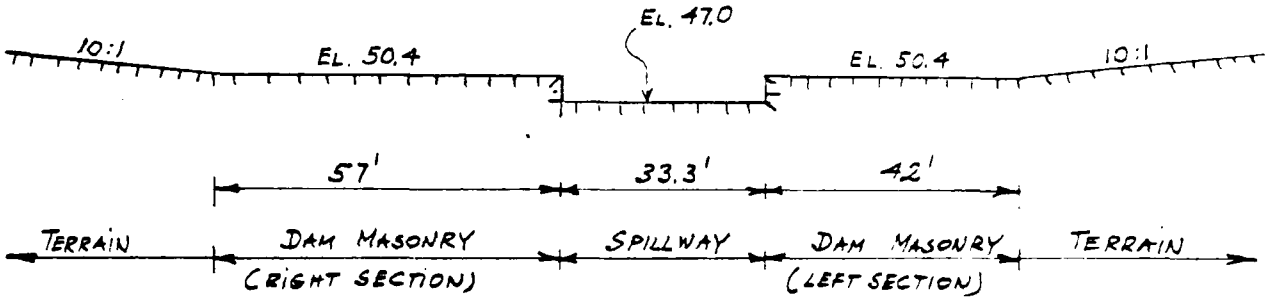
ASSUMING $C_1 = 2.2$ ($H < 2$ FT) AND $C_2 = 0.6$ ($H > 2$ FT) AND ADOPTING THE SPILLWAY CREST ELEV. 47.0 AS DATUM, THE SPILLWAY DISCHARGE IS APPROXIMATING BY:

$$Q_s = C_1 L_o H_1^{3/2} + C_2 A_o \sqrt{2g}\left(H_2 - \frac{3}{2}\right)^{\frac{1}{2}} = 2.2 \times 23.3 \times H_1^{3/2} + 0.6 \times 46.6 \times \sqrt{64.4}\left(H_2 - \frac{3}{2}\right)^{\frac{1}{2}}$$

$$Q_s = 51.3\, H_1^{3/2} + 224.4\left(H_2 - \frac{3}{2}\right)^{\frac{1}{2}}$$ (WHEN $H_1 < 2$ FT, $H_2 = \frac{3}{2}$; WHEN $H_2 > 2$, $H_1 = 0$)

ii. EXTENTION OF THE RATING CURVE FOR SURCHARGE OVERTOPPING THE DAM AND/OR ADJACENT TERRAIN

THE SUCCESS LAKE DAM IS A MASONRY STRUCTURE WITH A TOP ELEVATION OF 50.4 AND TOTAL LENGTH OF 99 FT. THE TERRAINS ADJACENT TO THE DAM HAVE SLOPES APPROXIMATELY 10:1 (SEE SKETCH BELOW).



DUE TO THE IRREGULARITIES IN THE PROFILE AN EQUIVALENT WEIR LENGTH MUST BE COMPUTED. ASSUMING A DISCHARGE COEFFICIENT C=2,3 AND ADOPTING THE SPILLWAY CREST AS DATUM (EL. 47.0), THE OVERFLOW CAN BE APPROXIMATED BY THE FOLLOWING EQUATIONS:

(1) TOP OF DAM AT EL. 50.4.

$$Q_D = 2.3 \times \frac{132.3}{128.3} \times (H_3 - 3.4)^{3/2} = 304.3\,(H_3 - 3.4)^{3/2}, \quad (H_3 > 3.4 \text{ FT})$$

(2) SLOPING TERRAIN TO THE LEFT AND RIGHT OF THE DAM:

$$L_S = \left(\tfrac{2}{5}\right) Z\,(H_3 - 3.4) = \left(\tfrac{2}{5}\right) 10\,(H_3 - 3.4) = 4\,(H_3 - 3.4)$$

∴ DISCHARGE OVER LEFT AND RIGHT TERRAINS

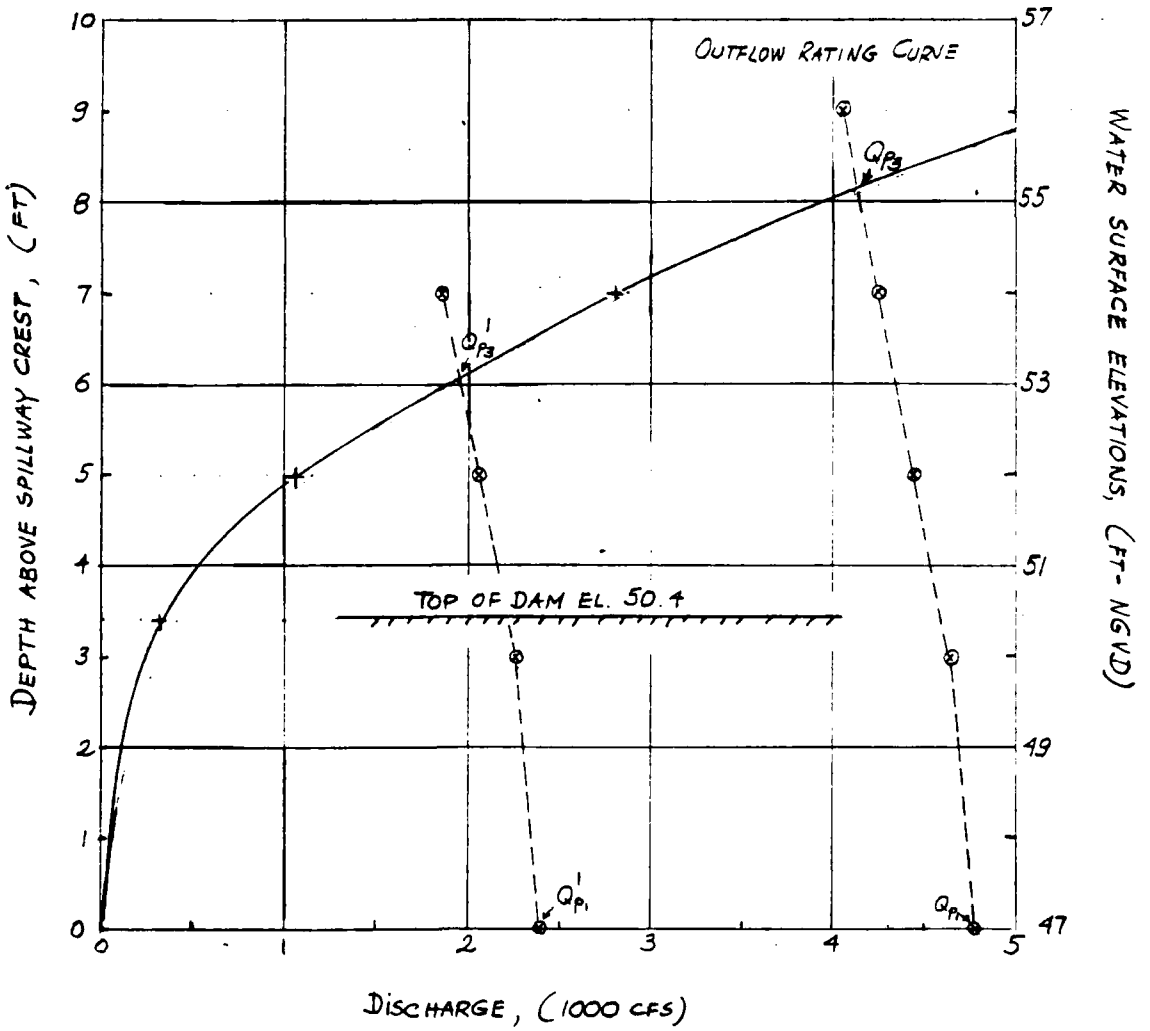
$$Q_S = 2 L_S\,(H_3 - 3.4)^{3/2} = 2 \times 4\,(H_3 - 3.4)^{5/2} = 8\,(H_3 - 3.4)^{5/2}$$

THEREFORE, THE TOTAL OUTFLOW RATING CURVE IS APPROXIMATED BY:

$$Q = 51.3\,H_1^{3/2} + 224.4\left(H_2 - \frac{3}{2}\right)^{1/2} + 304.3\,(H_3 - 3.4)^{3/2} + 8\,(H_3 - 3.4)^{5/2} \qquad H_3 \geq 3.4$$

WHEN $H_1 < 2$ FT, $H_2 = \frac{3}{2}$; WHEN $H_2 > 2$, $H_1 = 0$

THE RESULTING OUTFLOW RATING CURVE IS AS FOLLOWS:



b. SURCHARGE HEIGHT TO PASS PEAK INFLOWS (Q_p, AND Q_p')

i. @ $Q_{p_1} = 4780$ CFS $H_1 \cong 8.6$ FT

ii @ $Q_{p_1}' = 2390$ CFS $H_1' \cong 6.6$ FT

C. EFFECT OF SURCHARGE STORAGE ON PEAK OUTFLOWS :

i. AVERAGE POND AREA WITHIN EXPECTED SURCHARGE:

(1) POND AREA AT FLOW LINE (EL. 47.0) $A_{47}^{*} = 12.85$ AC

(2) POND AREA AT EL. 50.0 $A_{50}^{*} = 30.3$ AC

(3) AREA AT CONTOUR 60.0 $A_{60}^{*} = 68.8$ AC

* FROM IECO MEASUREMENTS ON THE BRIDGEPORT USGS QUADRANGLE MAP, CT

ASSUMING NORMAL POOL AT SPILLWAY CREST EL. 47.0, APPROXIMATING STAGE - STORAGE RATING CURVE WAS CONSTRUCTED (SEE P. D-6).

ii. DISCHARGE (Q_{p_2}) AT VARIOUS HYPOTHETICAL SURCHARGE ELEVATIONS :

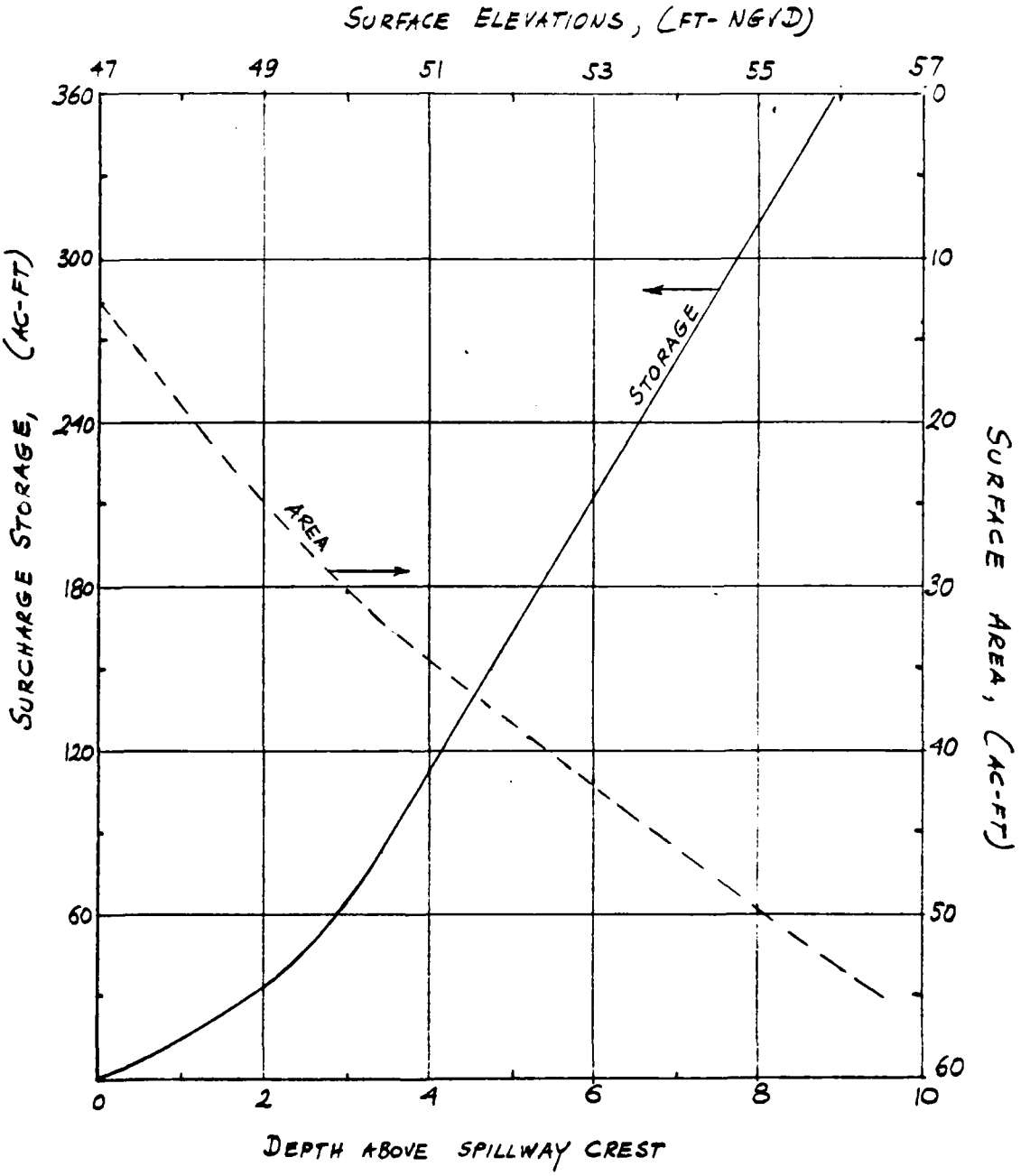
$H = 9$ FT, $V = 362$ AC-FT, $\therefore S = \frac{362}{2.3 \times 53.3} = 2.95$ IN

$H = 7$ FT; $V = 262$ AC-FT; $S = 2.14$ IN

$H = 5$ FT; $V = 162$ AC-FT; $S = 1.32$ IN

$H = 3$ FT; $V = 65$ AC-FT; $S = 0.53$ IN

STAGE-STORAGE AND STAGE-AREA CURVES



FROM APPROXIMATE ROUTING NED-ACE GUIDELINES AND 9 N MAXIMUM PROBABLE RUNOFF IN NEW ENGLAND:

$Q_{P_2} = Q_{P_1}\left(1 - \frac{S}{19}\right)$ AND FOR 1/2 PMF $Q'_{P_2} = Q'_{P_1}\left(1 - \frac{S}{9.5}\right)$

∴ FOR THE PREVIOUS HYPOTHETICAL SURCHARGES:

$H = 9$ FT;	$Q_{P_2} = 4038$ CFS,	$Q'_{P_2} = 1648$ CFS
$H = 7$ FT;	$Q_{P_2} = 4242$ CFS,	$Q'_{P_2} = 1852$ CFS
$H = 5$ FT;	$Q_{P_2} = 4448$ CFS;	$Q'_{P_2} = 2058$ CFS
$H = 3$ FT;	$Q_{P_2} = 4647$ CFS;	$Q'_{P_2} = 2257$ CFS

d. PEAK OUTFLOWS (Q_{P_3} AND Q'_{P_3}):

USING NED-ACE GUIDELINES "SURCHARGE STORAGE ROUTING" ALTERNATE METHOD AND RATING CURVE (SEE p. D-4):

$Q_{P_3} = 4120$ CFS $\quad H_3 = 8.1$ FT

$Q'_{P_3} = 1950$ CFS $\quad H'_3 = 6.05$ FT

3. SPILLWAY CAPACITY RATIO TO PEAK INFLOW AND OUTFLOW.

SPILLWAY CAPACITY TO TOP OF DAM (EL. 50.4) IS 309 CFS

% CAPACITY OF	INFLOW PMF	: 6
"	OUTFLOW "	: 8
"	INFLOW 1/2 PMF	: 13
"	OUTFLOW "	: 16

II. DOWNSTREAM FAILURE HAZARD

1. POTENTIAL IMPACT AREA

THE POTENTIAL IMPACT AREA IS LOCATED 3500 FT DOWNSTREAM FROM THE DAM LARGE 5-STORY CONCRETE BUILDING NEAR BOND STREET, HAS FIRST FLOOR ELEVATION ABOUT 20 FT ABOVE THE STREAMBED. THERE IS ALSO THE STATE ROUTE 1 BRIDGE LOCATED ABOUT 1/3 MILES DOWNSTREAM FROM THE DAM.

2. FAILURE OF SUCCESS LAKE DAM.

a. BREACH WIDTH

i. HEIGHT OF DAM:
TOP OF DAM EL. 50.4 ; DAM DOWNSTREAM TOE 34.9; ∴ H = 15.5 FT

ii. DAM MID-HEIGHT EL. 42.7 (50.4 - 15.5/2 ≈ 42.7)

iii. APPROXIMATE MID-HEIGHT LENGTH: $\ell \overset{*}{\approx} 50$ FT (SPILLWAY LENGTH IS NOT INCLUDED)

* FROM IECO DRAWINGS

iv. BREACH WIDTH (SEE NED-ACE DOWNSTREAM FAILURE GUIDELINES)

$W_b = 0.4\ \ell = 0.4 \times 50 = 20$ FT

b. PEAK FAILURE OUTFLOW (Q_{pi})

ASSUME SURCHARGE AT TOP OF DAM (EL. 50.4)

i. HEIGHT AT TIME OF FAILURE : $Y_o = 15.5$ FT

ii. SPILLWAY DISCHARGE AT TIME OF FAILURE : $Q_s = 309$ CFS

iii. BREACH OUTFLOW :

$$Q_b = 8/27\ W_b \sqrt{g}\ Y_o^{3/2} = 8/27 \times 20 \times \sqrt{32.2} \times 15.5^{3/2} = 2052 \text{ CFS}$$

iv. PEAK FAILURE OUTFLOW TO YELLOW MILL CHANNEL TRIBUTARY

$$Q_{p_1} = Q_s + Q_b = 309 + 2052 = 2360 \text{ CFS}$$

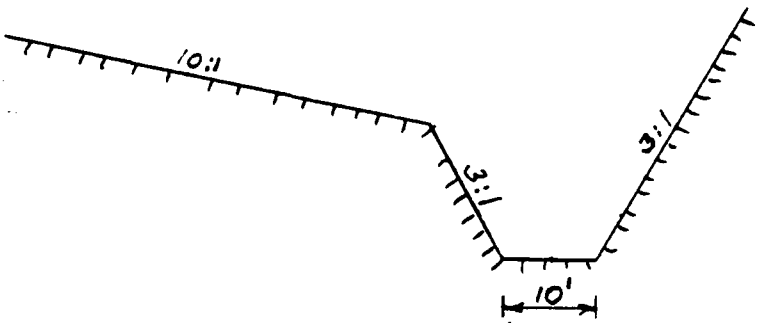
C. FLOOD DEPTH IMMEDIATELY DOWNSTREAM FROM DAM:

$$Y = 0.44\ Y_o = 0.44 \times 15.5 = 6.8 \text{ FT}$$

d. ESTIMATE OF DOWNSTREAM FAILURE CONDITIONS AT POTENTIAL IMPACT AREA (SEE NED-ACE GUIDELINES FOR ESTIMATING DOWNSTREAM FAILURE HYDROGRAPHS)

i. REACH OF YELLOW MILL CHANNEL TRIBUTARY BETWEEN DAM AND IMPACT AREA.

VARIES SIGNIFICANTLY IN SECTION. THE FIRST 1500-FOOT-LONG REACH IS APPROXIMATELY SHAPED AS SHOWN ON THE SKETCH BELOW:



CROSS SECTION REACH 1

THE AVERAGE SLOPE OF THE REACH IS 0.002 (±)

ii SUCCESS LAKE DAM RESERVOIR STORAGE AT TIME OF FAILURE.

STORAGE VOLUME BELOW SPILLWAY CREST APPROXIMATED BY 1/4 AH

$= 1/4 \times 12.85 \times 12.1 = 38.9$ AC-FT. SURCHARGE STORAGE TO THE OF THE DAM (EL. 50.4) IS 80.3 AC-FT (SEE STAGE-SURCHARGE CURVE ON p. D-6).

∴ MAXIMUM STORAGE VOLUME OF THE RESERVOIR IS $38.9 + 80.3 = 119.2$ AC-FT

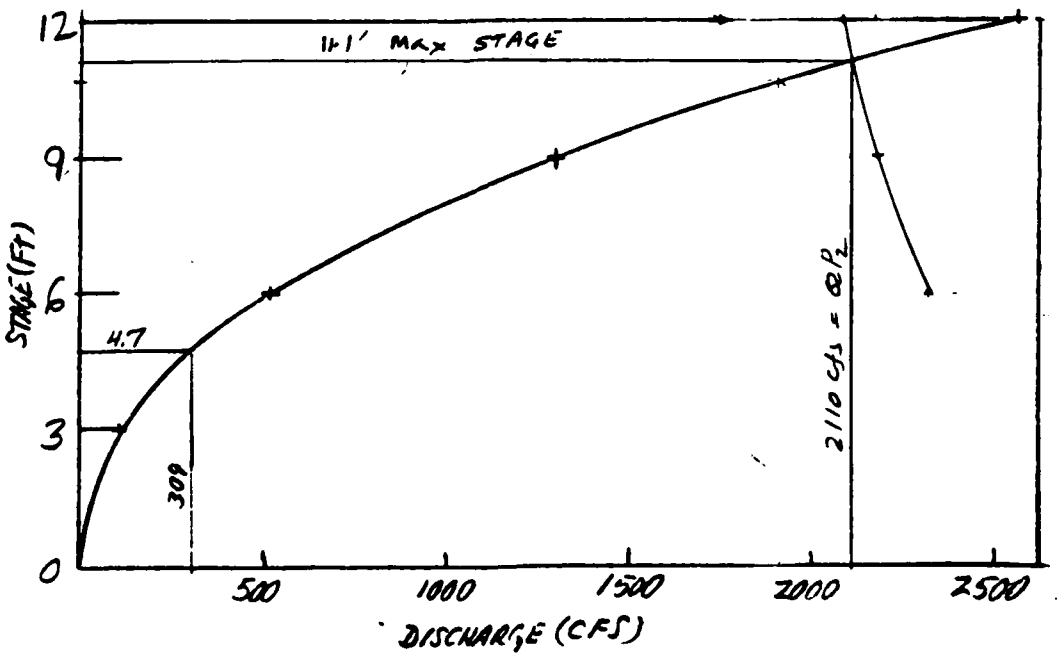
ASSUME $S_{MAX} = 119$ AC-FT

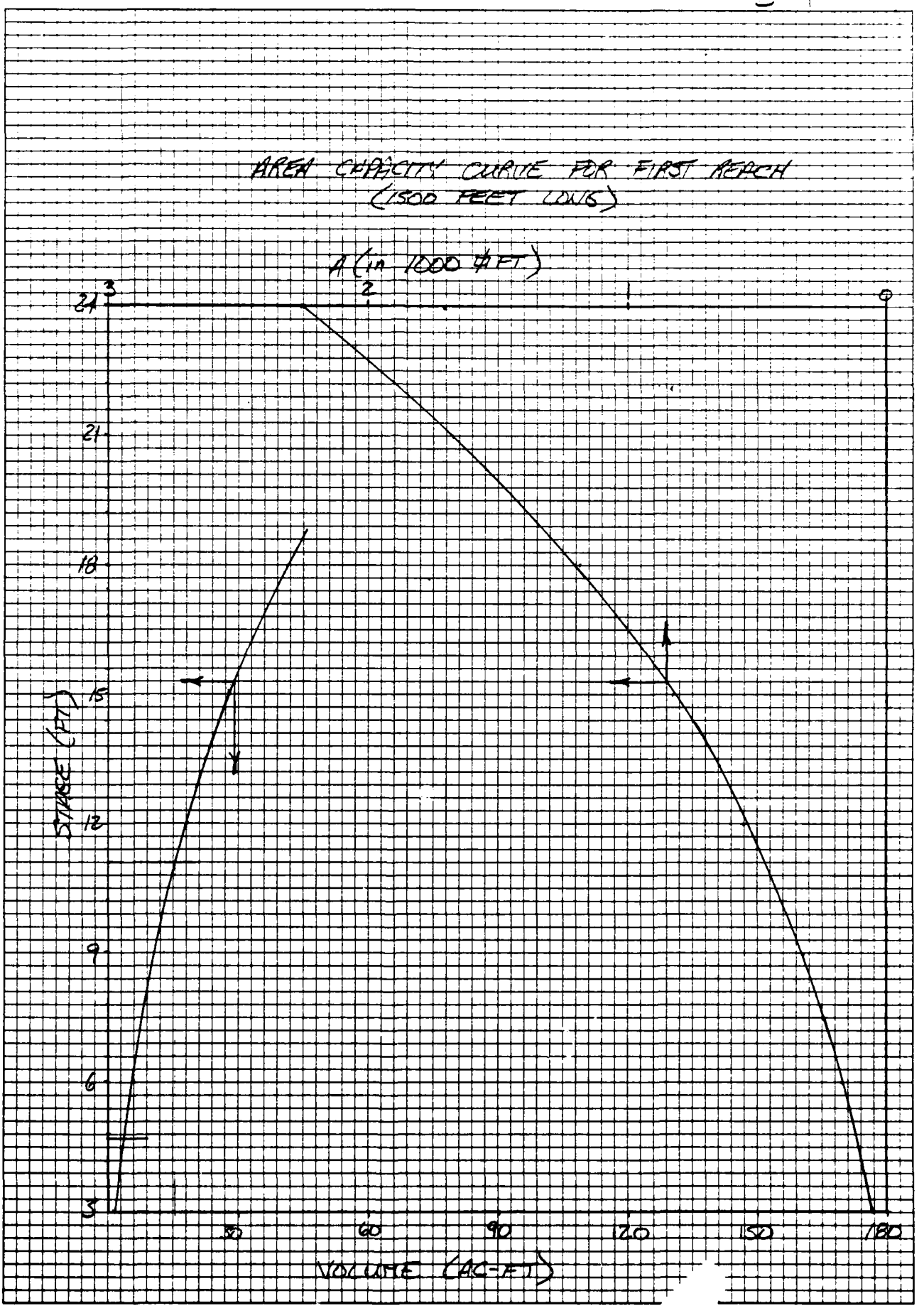
iii. PEAK INFLOW TO REACH: $Q_{p_1} = 2360$ CFS

iv. APPROXIMATE STAGE AT POTENTIAL IMPACT AREA FAILURE OF SUCCESS LAKE DAM

REACH $L = 3500$ FT; $n = 0.05$; $S = 0.002$; COMPUTED STAGE-DISCHARGE CURVE AND STAGE-AREA CURVE FOR THE BROOK SECTION AS SHOWN ON p. D-9 ARE PLOTTED ON p. D-11.

STAGE-DISCHARGE FOR CHANNEL-REACH 1





15.2
3.7
11.5

PRE FAILURE STAGE 4.7FT DISCHARGE 309CFS

INITIAL VOLUME ABSTRACTED @ 1 AC-FT

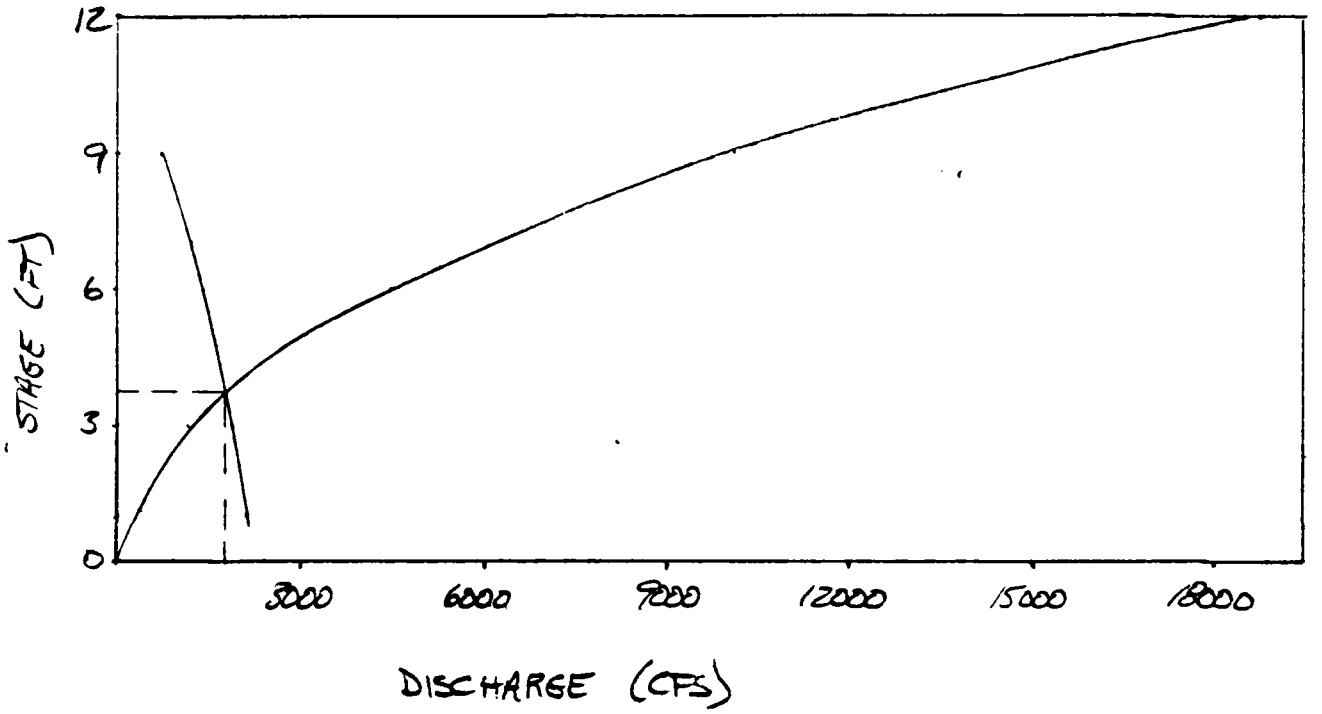
H	V	$Q_{P_2} = 2360\left(1 - \frac{Vol-1}{119}\right)$
3	1.7	2406
6	6.0	2320
9	12.9	2183
12	18.1	2080

RISE IN STAGE 11.1 - 4.7 = 6.4'

Q_{P_2} = 2110 CFS

REACH 2: L = 1400 FT n = 0.05 S = 0.002

STAGE DISCHARGE CURVE FOR REACH 2.



PRE FAILURE STAGE 1.0 FT DISCHARGE 309 CFS
INITIAL VOLUME ABSTRACTED V = 4.4 AC-FT
VOLUME ABSTRACTED BY REACH 1 ΔV_1 = 11.5 AC-FT
PLOTTING POINTS FOR GRAPHICAL ROUTING

H	VOL	$Q_{P_2} = 2110\left(1 - \frac{VOL - 4.4}{119 - 11.5}\right)$
1	4.4	2110
3	16.06	1881
6	41.07	1390
9	75.04	723

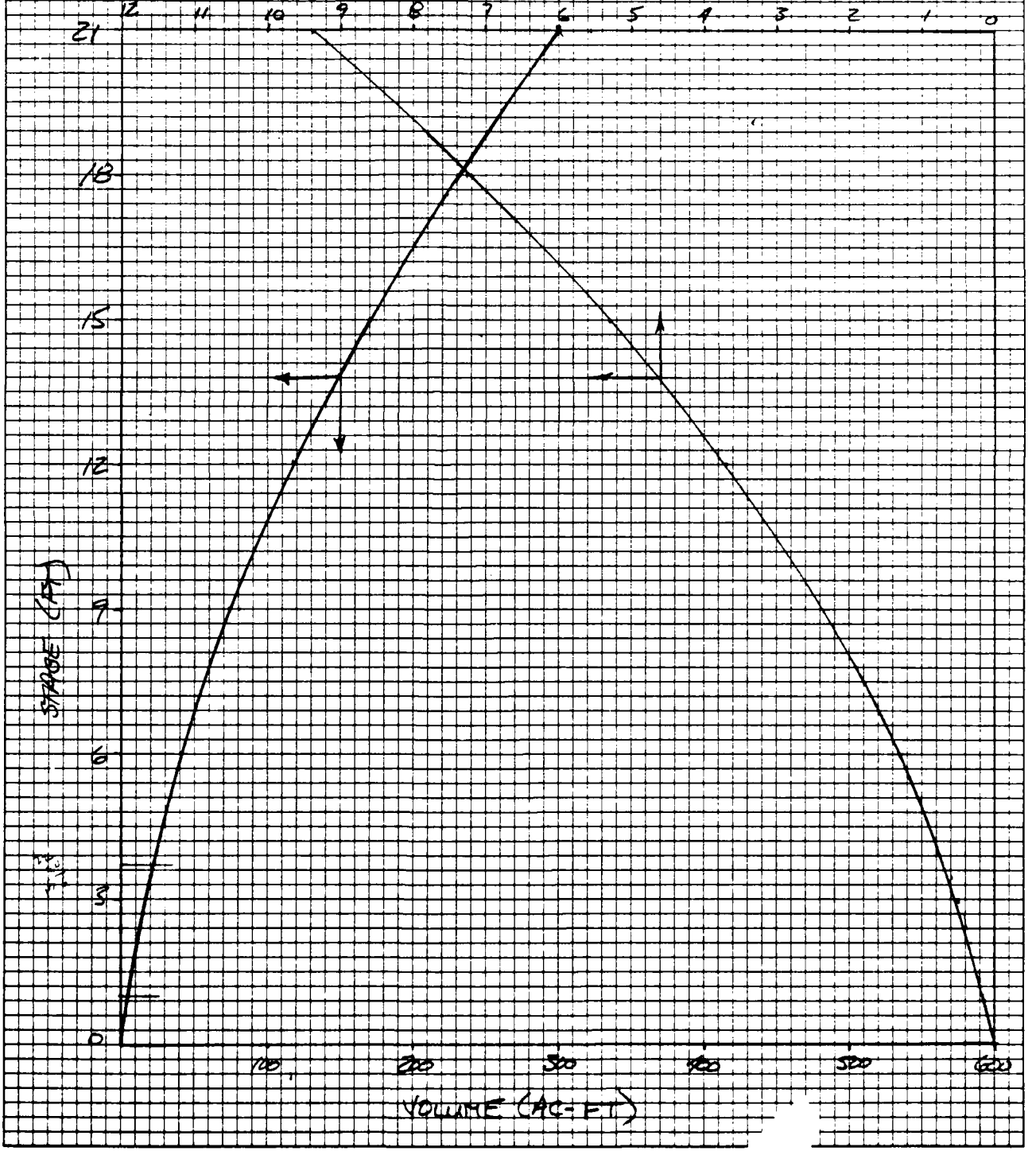
Q_{P_2} = 1800 cfs H = 3.7 FT ΔH = 2.7 FT

D-14

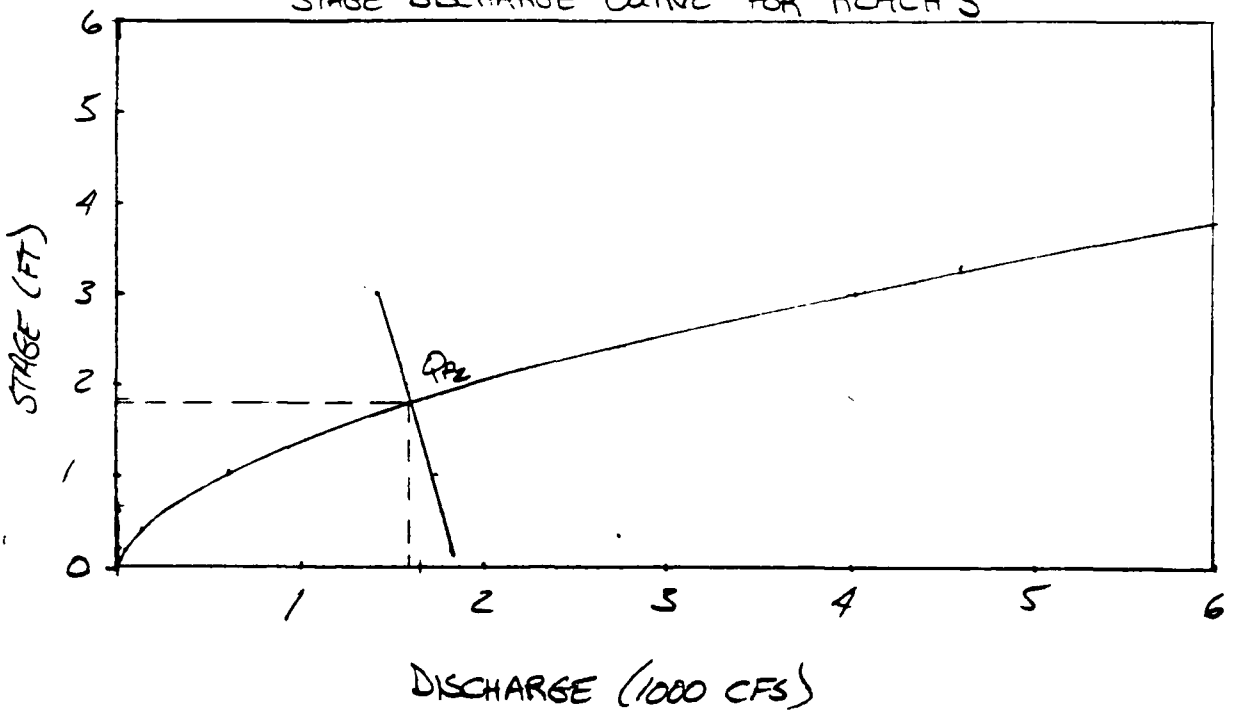
AREA CAPACITY CURVE FOR SECOND BEACH
(1400 FEET LONG)

CHANNEL SECTION

AREA (1000 FT²)



REACH 3: $L = 600$ FT $n = 0.05$ $S = 0.002$

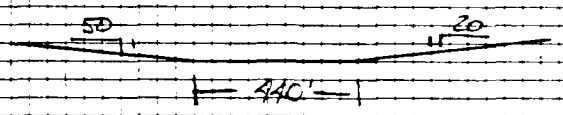


PREFAILURE STAGE ≈ 0.7 FT DISCHARGE 309 CFS

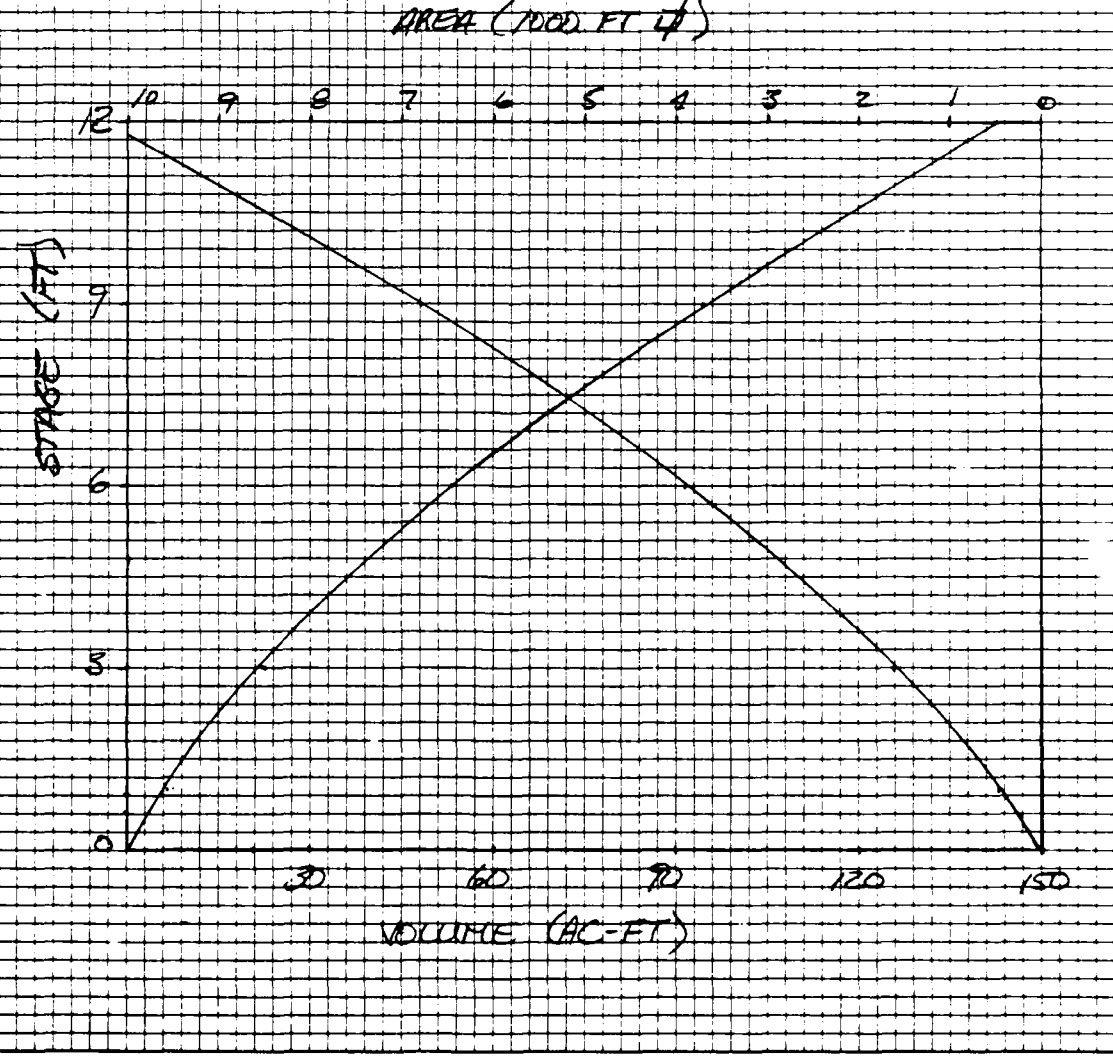
INITIAL VOLUME ABSTRACTED ≈ 3 AC-FT

H	VOL	$Q_{P_2} = 1800\left(1 - \frac{VOL-3}{119-17.5}\right)$
0.2	1.2	1836
0.6	3.8	1784
1.0	6.5	1730
1.4	9.4	1672
2.0	14.0	1580
3.0	22.5	1410

AREA CAPACITY CURVE FOR THIRD REACH (L = 600 FT)



CHANNEL SECTION
THIRD REACH



Q_{P_2} = 1620 CFS H = 1.8 FT

RISE IN STAGE ΔH = 1.8 - 0.7 = 1.1 FT

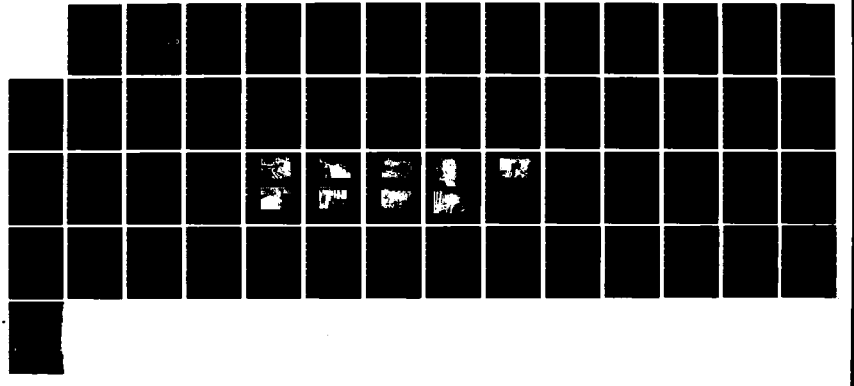
III. THE RISE IN STAGE WITHIN THE FIRST REACH WILL NOT EFFECT THE STRUCTURE IMMEDIATELY D/S FROM THE DAM (1ST FLOOR EL ≈ 20 FT ABOVE STREAM BED) THE RISE IN STAGE WITHIN THE THIRD REACH WILL HAVE LITTLE OR NO EFFECT ON THE STRUCTURES NEAR THE STREAM.

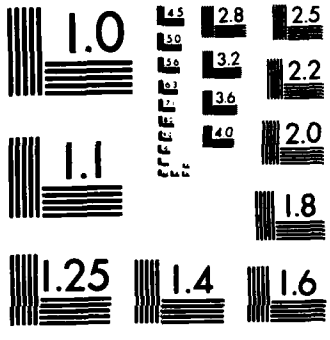
FILMED

8

AD-A142 830 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 1/1
SUCCESS LAKE DAM (CT.. (U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV MAY 81

UNCLASSIFIED F/G 13/13 NL





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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

AD-A142 830

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00079	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Success Lake Dam Conn. Coastal Basin, Bridgeport, Conn. NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE May 1981 13. NUMBER OF PAGES 50
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

DTIC ELECTE JUL 2 1984 S D A

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Success Lake Dam
Conn. Coastal Basin
Bridgeport, Conn.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Success Lake Dam, constructed in 1875, is a 132 ft. long, 17 ft. high structure composed of two earthfill embankments and a central 33 ft. long broad crested spillway. The original timber spillway decking has since been capped with concrete There is a small single land bridge, across the overflow spillway section. Flow over the spillway is channeled through five 4 ft. wide, 2 ft. high openings, and one 3.3 ft. wide, 2 ft. high, opening formed by the bridge piers. The upstream concrete face of the spillway has a slope of approx. 2H:1V and the masonry downstream face is vertical.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

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SUCCESS LAKE DAM

CT 00079

CONNECTICUT COASTAL BASIN

BRIDGEPORT, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

MAY 1981

CONSULTING
ENGINEERS

INTERNATIONAL ENGINEERING COMPANY, INC.
A MORRISON-KNUDSEN COMPANY

EASTERN DISTRICT OFFICE
777 POST ROAD DARIEN, CONNECTICUT 06820
PHONE (203) 655-3345

11410
2616-110

May 7, 1981

Mr. E. P. Gould
Project Management Branch
Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Reference: Contract No. DACW33-81-C-0015
Inspection and Evaluation of Non-Federal Dams
FY-81, Southwestern Connecticut

Dear Mr. Gould:

The inspection of Success Lake Dam and subsequent hydrologic-hydraulic investigation revealed that the dam should be classified as having a low hazard potential. The following is an abbreviated Phase I Inspection report to substantiate this classification.

Sincerely,

Reynold A. Hokenson

Reynold A. Hokenson, P. E.
Project Manager

RAH:mem

Enclosures

TABLE OF CONTENTS

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification No: CT 00079

Name of Dam: Success Lake Dam

Town: Bridgeport

County and State: Fairfield, Connecticut

Stream: Yellow Mill Channel

Dates of Inspection: February 5 and 19, 1981

BRIEF ASSESSMENT

The Success Lake Dam impounds Success Lake on the Yellow Mill Channel tributary in Bridgeport, Fairfield County, Connecticut. The structure is currently owned by Remington Arms Company, Inc., 939 Barnum Avenue, Bridgeport, Connecticut. The operation of the facility is the responsibility of Robert H. Gruss, Plant Engineer, Remington Arms Co., Inc., (203) 333-1112. Currently, the impoundment is maintained for aesthetics and wildlife conservation.

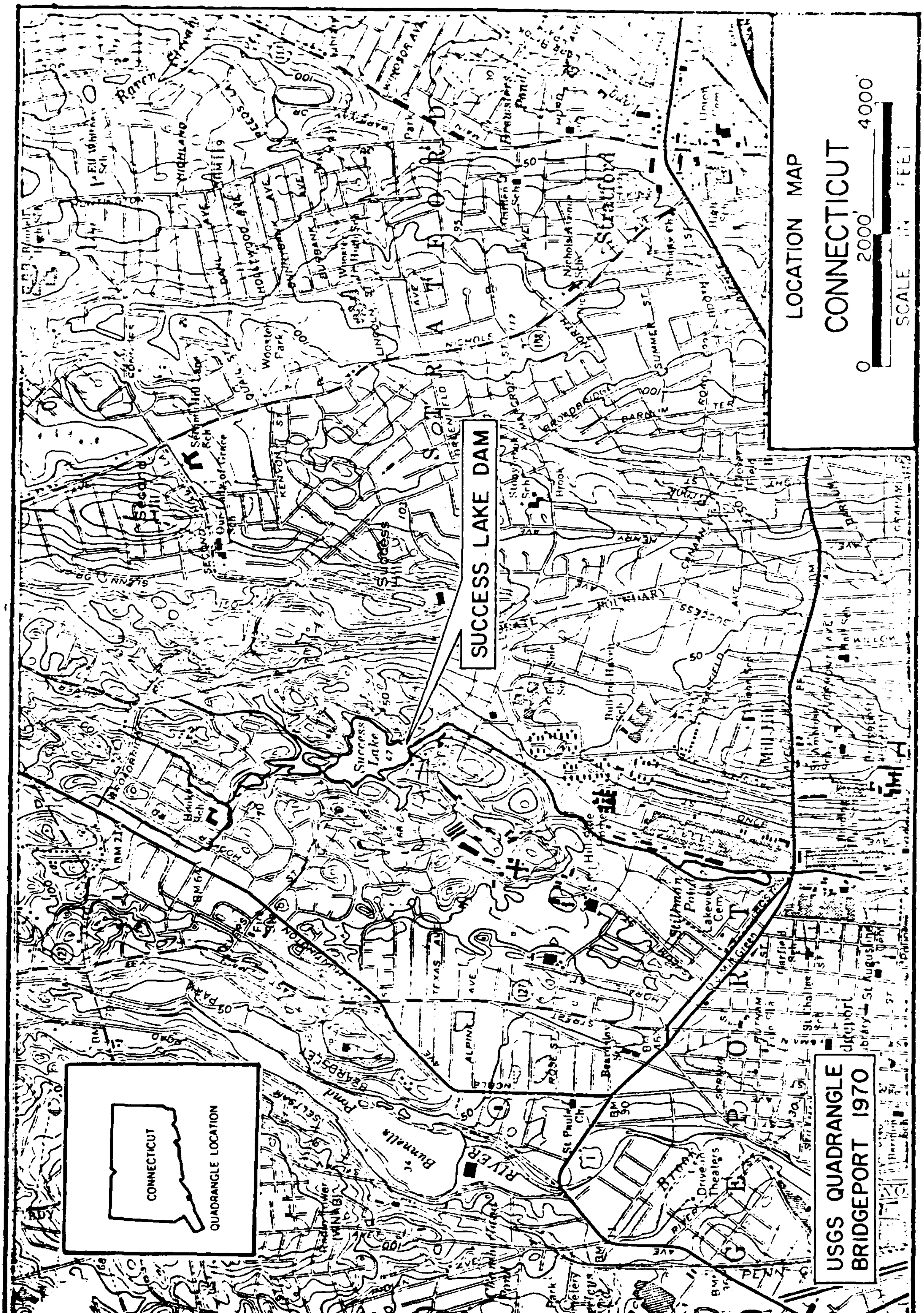
The Success Lake Dam, constructed in 1875, is a 132-foot-long, 17-foot-high structure composed of two earthfill embankments and a central 33-foot-long broad crested spillway. The original timber spillway decking has since been capped with concrete. There is a small single land bridge, across the overflow spillway section (Photo 1). Flow over the spillway is channeled through five 4-foot-wide, 2-foot-high openings, and one 3.3-foot-wide, 2-foot-high, opening formed by the bridge piers. The upstream concrete face of the spillway has a slope of approximately 2H:1V and the masonry downstream face is vertical. The downstream slopes of the two-side embankments are formed by vertical stone retaining walls. The upstream slopes also appeared to be vertical stone retaining walls, however, these areas were, for the most part, concealed beneath the water surface and accumulated sediments (Photos 2 and 3).

Two cast [illegible] conduits pass through the earthfill embankment at the right abutment of the dam and provide additional outlets from the impoundment. A 14 inch diameter conduit exits the dam near its base approximately 12 feet from the right side of the spillway. Discharges from this conduit are regulated by a hand operated valve which is housed in a small masonry structure (Photo 9). The second conduit is 8 inches in diameter and emerges from the right embankment, approximately 5 feet below the top of the dam and about 25 feet from the spillway (Photo 7). This conduit extends 126 feet downstream to a small brick structure where, at one time, it provided water for the generation of steam (Photo 8). The brick structure formerly housed equipment for the generation and distribution of steam to the various industrial processes that were performed by Remington Arms Company, Inc., in the 1940's. This equipment was removed from the site and the building was converted to an employee locker room. The 8-inch conduit leading to this building, though deteriorated, is still intact.

Visual inspection of the site indicated that the dam is in poor condition. The inspection revealed the following: deterioration of the vertical downstream face of the spillway, cracked and missing portions of the concrete spillway crest along the downstream edge (Photo 4), cracks along the upstream and downstream interfaces of the spillway and abutments, exposed aggregate on the concrete spillway cap, seepage along the toe of the left embankment has resulted in a 20-foot by 30-foot marshy area approximately 40 feet from the dam, and a potentially inoperable low-level outlet. The seepage beneath the spillway, described in the inspection report submitted by William P. Sanders of the State of Connecticut Water Resource Commission on July 22, 1964 (see Correspondence), was not confirmed during the inspections con- ducted by IECO on February 2 and 19, 1981. During these inspections, an accumulation of rocks at the base of the spillway, ice formations on the downstream face of the spillway and particularly water flowing over the spillway made it impossible to examine this portion of the dam closely (Photos 5 and 6). Water was observed draining vertically through cracks in the concrete cap near the left upstream spillway abutment, but no corresponding of discharge was noted on the downstream

face of the spillway. In addition, localized outward movement of the stone retaining wall and the concrete spillway cap were also found in the vicinity of the left spillway abutment. The effected area is approximately 7 feet wide, but the movement has been slight and is a local condition not threatening the dam.

The Success Lake Dam has a maximum potential storage capacity of 119 acre-feet (ac-ft) and is approximately 17 feet in height. Since the dam falls within the Corp's criteria for the small size category based on storage (between 50 and 1,000 ac-ft), the dam is considered to be SMALL in size. The dam breach analysis was conducted in accordance with the "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", dated April 1978, and the potential impact area was defined. Failure of the dam would cause the water surface within the streambed immediately down- stream of the dam to rise from 4.7 feet at a prefailure outflow of 310 cfs to 11.1 feet at an outflow of 2,360 cfs. The first floor of the brick structure located approximately 130 feet downstream from the dam is more than 20 feet above the streambed, and this will not be effected by the flood wave. The only remaining other structures adjacent to the Yellow Mill Channel are located 3,500 feet downstream from the dam. These will sustain little or no damage since the water surface within this reach will rise only 1.8 feet above the streambed. Since failure of the dam will cause little or no property damage and no loss of life, the dam has been classified as having a LOW hazard potential.


LOCATION MAP
CONNECTICUT
0 2000 4000
SCALE IN FEET
SUCCESS LAKE DAM
USGS QUADRANGLE
BRIDGEPORT 1970
CONNECTICUT
QUADRANGLE LOCATION

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Success Lake Dam

DATE 02/5 & 19/81

TIME 10:00 a.m.

WEATHER Sunny, Cold

W.S. ELEV. 47.1

PARTY:	INITIALS:
1. Jeffrey T. Klaucke	JK
2. Myron B. Petrovsky	MP
3. Ernst H. Buggisch	EB
4. Paul Archer	PA
5. Harold Farnham	HF (Matthews Associates)

PROJECT FEATURE:	INSPECTED BY:
1. Dam	JK, MP, EB, PA
2. Intake Channel	JK, MP
3. Valvehouse	JK, HF, MP
4. Powerhouse Conduit	HF, JK, MP
5. Low Level Outlet	HF, JK, MP
6. Low level Outlet Channel	JK, MP, EB, PA
7. Spillway	JK, MP, EB
8. Bridge	JK, PA, EB

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Dam NAME: JK, MP, EB, PA

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	47.0
Current Pool Elevation	47.1
Maximum Impoundment to Date	Approximately 50.0
Surface Cracks	None
Pavement Condition	Good
Movement or Settlement of Crest	None
Lateral Movement	Local movement on upstream face near left spillway abutment.
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Cracks along U/S and D/S interfaces with spillway.
Indications of Movement of Structural Items on Slopes	Minor bulging of U/S and D/S retaining walls.
Trespassing on Slopes	None.
Sloughing or Erosion	None
Rock Slope Protection	The exposed U/S walls were irregular and missing stones.
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	Wet area at D/S toe on the left bank. Seepage noted through valvehouse.
Piping or Boils	Possible piping along low level outlet conduit.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Dam (Continued) NAME: JK, MF, EB, PA

AREA EVALUATED	CONDITION
Foundation Drainage Features	Unknown
Toe Drains	Unknown
Instrumentation System	None

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Intake Channel NAME: JK, MP

AREA EVALUATED	CONDITION
OUTLETS WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Success Lake
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	No structure visible above current pool level.
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Valvehouse NAME: JK, HF, MP

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	Fair, wooden roof rotted.
Condition of Joints	Good
Spalling	None
Visible Reinforcing	None
Rusting or Staining of Concrete	Near crack in valvehouse wall
Any Seepage or Efflorescence	Seepage noted through crack in valvehouse wall.
Joint Alignment	Good
Unusual Seepage or Leaks in Gate Chamber	None
Cracks	Right wall of valvehouse
Rusting or Corrosion of Steel	Exposed portion of low level outlet conduit.
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Mechanical Valve	Not tested at owner's request
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Low level Outlet NAME: HF, JK, MP

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Conduit	Fair
Rust or Staining on Conduit	Superficial rust on exposed conduit.
Spalling	N/A
Erosion or Cavitation	None
Cracking	None
Alignment of Monoliths	N/A
Alignment of Joints	N/A
Numbering of Monoliths	N/A
	Note: Only a small portion of the cast iron conduit (approximately 8 in.) was visible.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Low Level Outlet Channel NAME: JK, MP, EB, PA

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	N/A
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain holes	
Channel	
Loose Rock or Trees Overhanging Channel	Large rocks and 5 to 20 in. diameter trees were found immediately D/S of the outlet and adjacent to the spillway discharge channel.
Condition of Discharge Channel	Large rocks have accumulated on the channel floor.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Spillway NAME: JK, HF, EB

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Success Lake
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Masonry	Loose stones in retaining walls, some stones missing and wall movements noted near spillway.
Rust or Staining	None
Spalling of spillway concrete cap	Near downstream edge of spillway weir.
Any Visible Reinforcing	None
Any Seepage	Some vertical drainage into dam through cracks in the spillway cap.
Drain Holes	None
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	Loose rocks from downstream walls of spillway have accumulated in discharge channel.
Trees Overhanging Channel	Large tree on right bank between valvehouse and spillway.
Floor of Channel	Strewn with large rocks.
Other Obstructions	None

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Bridge NAME: JK, PA, EB

AREA EVALUATED	CONDITION
OUTLET WORKS - BRIDGE	
a. Super Structure	N/A
Bearings	
Anchor Bolts	N/A
Bridge Seat	N/A
Longitudinal Members	N/A
Under Side of Deck	Good
Secondary Bracing	None
Deck	Good
Drainage System	All 3 inch diameter drains in curbs were free of obstructions.
Railings	Good
Expansion Joints	None
Paint	N/A
b. Piers	
General Condition of Concrete	Good
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	
	Note: The bridge is supported 2 feet above the spillway by 4 concrete piers that are founded on the spillway.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam DATE: 02/5 & 19/81

PROJECT FEATURE: Powerhouse Conduit NAME: JK, HF, MP

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	N/A
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Mechanical Valve	Valve inoperable, conduit has not been used since the 1940's.
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

APPENDIX B

ENGINEERING DATA

SUMMARY OF DATA AND CORRESPONDENCE

No. _____

Inventoried By _____

Date _____

WATER RESOURCES UNIT
SUPERVISION OF DAMS
INVENTORY DATA

Lat: 41° 12.3'
Long: 73° 9.9'

Name of Dam or Pond SUCCESS LAKE

Code No. _____

Nearest Street Location Huntington Turnpike

Town Bridgeport

U.S.G.S. Quad. Bridgeport

Name of Stream Unnamed

Owner Remington Arms Company, Inc.

Address Barnum Avenue
Bridgeport, CT

Pond Used For Fire Protection Drainage Area 2.43 sq. mi.

Dimensions of Pond: Width 700' Length 1100' Area 18.3 ac.

Total Length of Dam 125' Length of Spillway 35'

Location of Spillway Center of dam

Height of Pond Above Stream Bed 15'

Height of Embankment Above Spillway 3'

Type of Spillway Construction Concrete cap

Type of Dike Construction Masonry

Downstream Conditions Bridgeport

Summary of File Data _____

Remarks _____

Would Failure Cause Damage? _____ Class _____

NEW YORK LICENSE 4755
CONNECTICUT REGISTRATION 4

JOSEPH W. CONE
CIVIL ENGINEER
124 HAVEMEYER PLACE
GREENWICH, CONNECTICUT
06830

TELEPHONE
TOWNSEND 9-2152

June 7, 1966

Mr. William H. O'Brien III
Water Resources Commission
State Office Building
Hartford 15, Conn.

Re: Dam #46 Stillman Pond-Bdpt.
AND SUCCESS LAKE DAM

Dear Mr. O'Brien:

As requested, I have inspected the Stillman Pond Dam and the tributary watershed. Also permission was obtained from Remington Arms office to inspect Success Lake Dam, being escorted by one of their guards, since the condition of this dam is involved with Stillman.

	Success	Stillman
Watershed	2.28 sq.mi.	3.44 sq. mi.
Peak Q pres 100 yr	1250 cfs	1890 cfs
" " 2000 AD 400 yr	4370 "	5130 "

Both dams are solidly constructed and, in my opinion, will not fail but both will be overtopped in the future. Both have very low headroom, Success 6 openings averaging 4'x2'; openings were not measured at Stillman, it was evident that dam is safe although it will be overtopped.

Tracks serving the G.E. Plant will be flooded in the future during a severe storm due to channel of inadequate capacity.

Copies of work sheets, three photos and map of watersheds are enclosed. See Lake Forest for more applicable data.

My recommendation is that your office suggest to Remington Arms and General Electric that there be a standing order that their maintenance men see to it that openings at dams be kept clear of debris during heavy storms, this to reduce frequency of overtopping.

Very truly yours,

J. W. Cone

JWC/dr
Enc: 6

[illegible]

[illegible]

FOREST 725 Ac — 1.445 sq. mi. [illegible] = 1.3
25 yr [illegible]
(Chart B) Q [illegible] = 850 cfs [illegible] 1980

Entire shed developing rapidly. Rolling terrain.

Constant 1.08

Q present 25 yr	= RF × LF × FF × Q		cfs/Ac
	= 1 × 0.8 × 1 × 850	= 680 cfs	0.73
Q " 100 yr	= 1 × 0.8 × 1.8 × 850	1220	1.7
Q " 400 yr	= 1 × 0.8 × 3.8 × 850	= 2580	2.8
" 2000 AD "	= 1 × 1.0 × 3.8 × 850	= 3240	3.5

Compare 3240 with 1955 Floods 1.5 sq. mi on Q = 5000 √A = 4150 cfs
= 6000 on 1.445

SUCCESS 1460 Ac — 2.28 sq. mi
Entire area developing rapidly except 132 Ac occupied by [illegible]
Rolling terrain rather flat

Chart B Q = 1150 cfs

Constant .635

Q pres. 25 yr	= RF × LF × FF × Q		
	= 1 × 0.6 × 1 × 1150	= 690 cfs	0.47
" 100	= 1 × 0.6 × 1.8 × 1150	1250	0.85
" 400	= 1 × 0.6 × 3.8 × 1150	2620	1.8
2000 AD "	= 1 × 1.0 × 3.8 × 1150	4370	3.0

Provided Rem Lirans Controls large area.

[illegible] 2200 Ac
3.44 sq. mi. Chart B Q = 1500

Constant .455

Q pres 25 yr	= RF × LF × FF × Q		
	= 1 × 0.7 × 1 × 1500	= 1050	0.48 cfs/Ac
" 100	= 1 × 0.7 × 1.8 × 1500	1890	0.86
" 400	= 1 × 0.7 × 3.8 × 1500	4000	1.8
2000 AD "	= 1 × 0.9 × 3.8 × 1500	5130	2.3

Provided Rem Areas & G.E. do not develop 330 Ac

(A)

J.V.C.
5/8

Forest [illegible] Stillman

[illegible] C
5/4/66

Lake Forest #25

Watershed: 580; 2 | 11.55; 5.775; Chain 2.79 sq in; 1.443 sq mi; **925 Ac**

Lake Area: 0.4[illegible]; 2 | [illegible]; 4 | [illegible]; .105 sq mi; [illegible] Ac

Storage Ratio 1:14 Fair

Lake Success above Stillman

Watershed: 9.13; 2 | 18.24; 4 | 9.12; 2.28 sq mi; **1460 Ac**

Lake Area: 0.18; 3 | 0.46; 4 | .153; .038 sq mi; **24 Ac**

Storage Ratio 1:61 Very Poor

[illegible] New Area trib to Success: 4 | .82; .205 sq mi; 132 Ac

Stillman Pool below Success

Watershed: 4.70; [illegible]; [illegible] sq mi; 7[illegible] Ac

Lake Area: .06; [illegible]; [illegible] sq mi; 9 Ac

Storage Ratio 1:83 Very Bad practically 0

Owned by Bear Aves & G.E. trib to Stillman including trib to Success: 4 | 2.0[illegible]; .515; 330 Ac.

TOTAL Stillman #46 (includes Success)

Watershed: 13.76; 2 | 27.55; 4 | 13.77; 3.44 sq mi; **2200 Ac**

1460
750
2210 Check

Lake Surface: Success 24 Ac; Stillman 9; Total 33 Ac

Lenshed 3.15± mi
Available " 1.1± "

Total Storage Ratio 1:67 Very poor

(B)

Remington DUPONT

REMINGTON ARMS COMPANY, INC.

PETERS DUPONT

MANUFACTURERS OF
SPORTING FIREARMS, AMMUNITION
TRAPS TARGETS
POWER TOOLS

ARMS AND CARTRIDGE POWERED TOOLS
ILION, N. Y.
AMMUNITION, BRIDGEPORT, CONN.
POWER TOOLS, PARK FOREST, ILL.

BRIDGEPORT 2, CONNECTICUT

PETERS CARTRIDGE DIVISION
BRIDGEPORT, CONN
TRAPS AND TARGETS, FINDLAY, OHIO
CABLE – HARTLEY, BRIDGEPORT
– ALL CODES –

October 9, 1964

SUCCESS LAKE DAM
BRIDGEPORT

State of Connecticut
Water Resources Commission
State Office Building
Hartford 15, Connecticut

Attention Mr. William P. Sander, Engineer-Geologist

Gentlemen:

Reference - Your letter of July 22, 1964

The leakage under the spillway is a condition we are aware of and have been checking periodically. There is no apparent increase in the water flow over the past ten years and we, therefore, feel this is not a condition to cause concern. The massive construction of this dam should be adequate if the leaks do not become larger, or general deterioration set in.

We have a periodic inspection set up whereby the quantity of water leaking is measured and checked against previous findings. Any increase will be readily recognized and prompt remedial action will be taken.

The trees specified in your report have been removed.

Very truly yours,

REMINGTON ARMS COMPANY, INC.
H.M. PIERCE, JR., WORKS MANAGER

J. P. Barry
Works Engineer

JPB:O'L

B-6

July 22, 1964

Mr. H. M. Pierce, Jr., Plant Manager
Remington Arms Company, Inc.
Barnum Avenue
Bridgeport, Connecticut

Dear Sir:

The Water Resources Commission has recently completed an inventory of all the dams in the Town of Bridgeport.

During the inventory, the dam forming Success Lake was inspected and was found to be in need of repair. At the date of the inspection, all stream flow was through leakage under the spillway. In addition, the trees which are growing on the dam should be removed. These points are not critical at the present time but represent a condition which could lead to failure of the dam.

We would appreciate hearing what plans you have to place this structure in a safe condition.

Very truly yours,

William P. Sander
Engineer - Geologist

WPS:js

INVENTORY OF DAMS IN THE INTERIOR

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(10) NAME	(11) LATITUDE (NORTH)	(12) LONGITUDE (WEST)	(13) REPORT DATE DAY | MO | YR
CT	79	NED	CT	001	04				SUCCESS LAKE DAM	4112.3	7309.9	10DEC73

(14) POPULAR NAME	(15) NAME OF IMPOUNDMENT
	SUCCESS LAKE

(16) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	07	TR-YELLOW MILL CHANNEL	MILL HULL	1	250000

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE–FT.)	(26) IMPOUNDING CAPACITIES NORMAL (ACRE–FT.)
CH	1875	D	18	17	124	109

DIST DAM FED REG PRV/FED SEC A VER/DATE
NED

(27) REMARKS
20-ESTIMATE 22-ESTIMATE

(28) D/S HAS	(29) SPILLWAY CREST LENGTH	(30) SPILLWAY TYPE	(31) SPILLWAY WIDTH (FT.)	(32) MAXIMUM DISCHARGE (FT.)	(33) VOLUME OF DAM (CY)	(34) POWER CAPACITY INSTALLED (MW)	(34) POWER CAPACITY PROPOSED (MW)	(35) NAVIGATION LOCKS NO	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
	125		35													

(36) OWNER	(37) ENGINEERING BY	(38) CONSTRUCTION BY
REMINGTON ARMS		

(39) REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE

(40) INSPECTION BY	(41) INSPECTION DATE DAY | MO | YR	(42) AUTHORITY FOR INSPECTION
DEPT ENV PROT	03NOV72	PA 571 SECT 25-11 ST OF CT

(43) REMARKS

CALL to reserve clearance. on days notice.
Bob Gruss Ext 1316.

Letter approx. time & date
2 weeks

REPORTS CONTROL SYMBOL
DASN-CWB-17

APPENDIX C

PHOTOGRAPHS

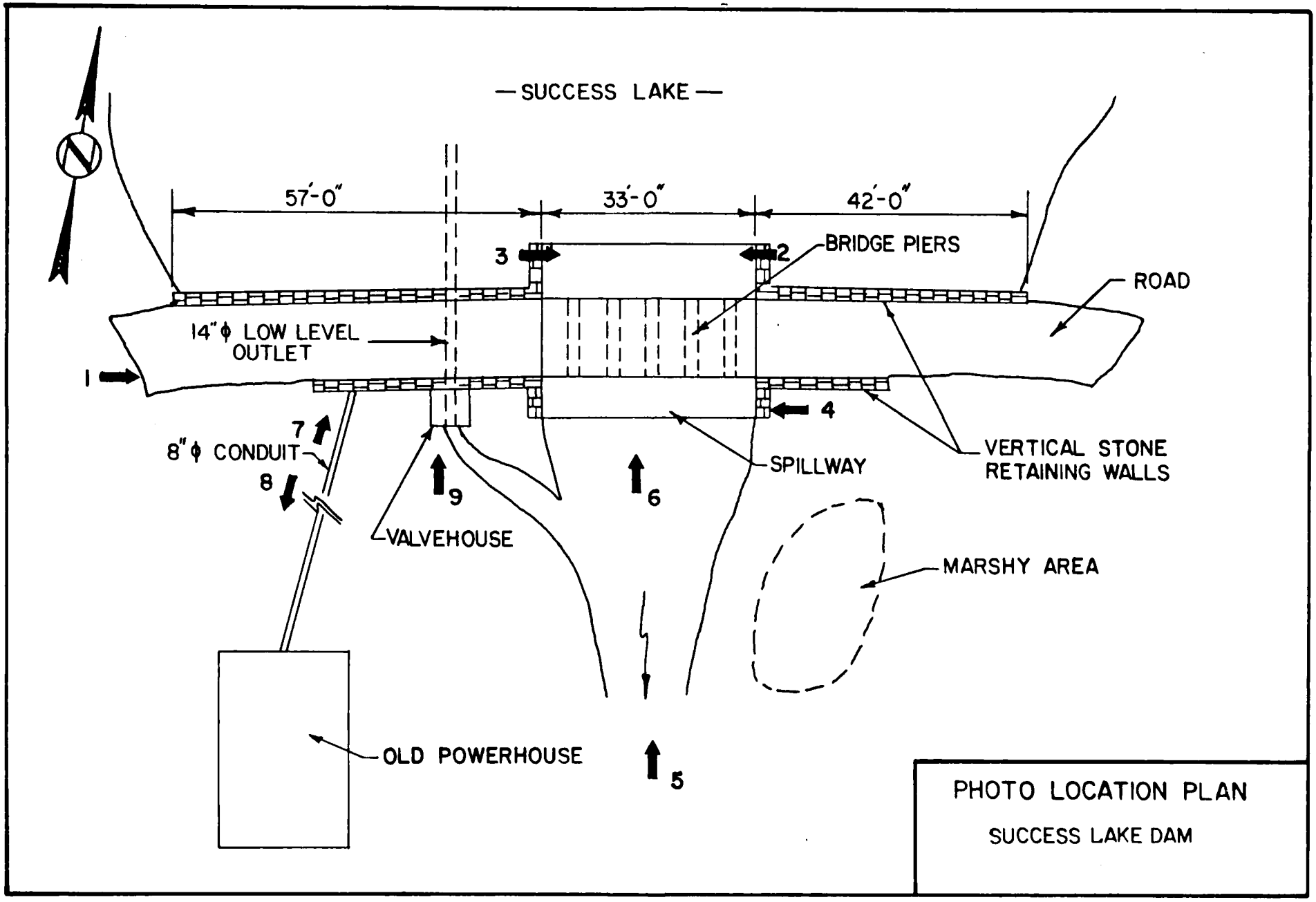

— SUCCESS LAKE —
57'-0"
33'-0"
42'-0"
BRIDGE PIERS
ROAD
14" ϕ LOW LEVEL OUTLET
1
2
3
4
5
6
7
8
9
8" ϕ CONDUIT
VALVEHOUSE
SPILLWAY
VERTICAL STONE RETAINING WALLS
MARSHY AREA
OLD POWERHOUSE
PHOTO LOCATION PLAN
SUCCESS LAKE DAM

Photo 1 Top of dam and single lane road.

Photo 2 Upstream face of dam, spillway crest and right dam embankment.

Photo 3 Upstream face of dam, spillway crest and left dam embankment.

Photo 4 Downstream spillway crest and bridge piers.

Photo 5 Downstream face of dam.

Photo 6 Downstream masonry face of spillway.

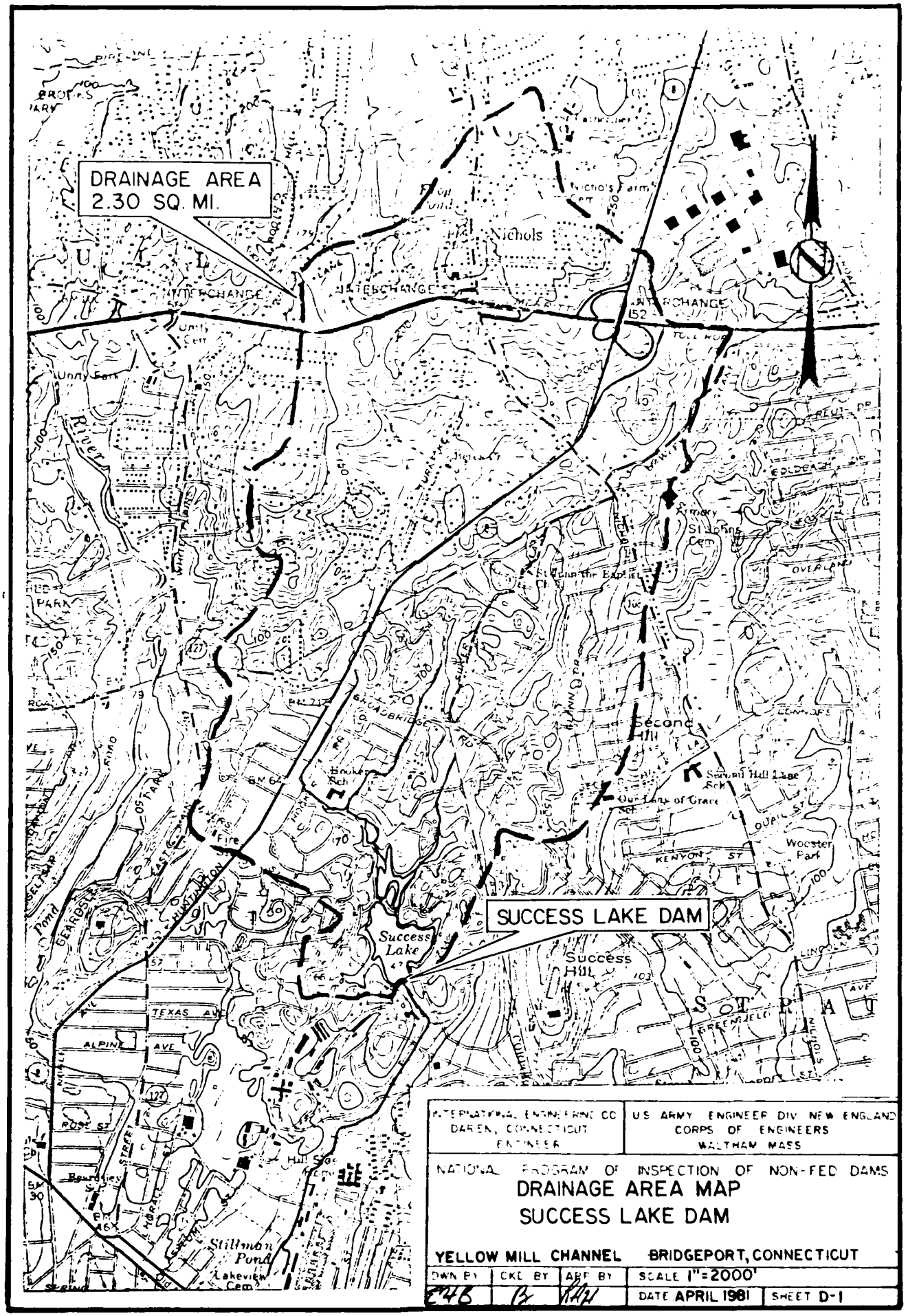
Photo 7 Downstream masonry face of right dam embankment, 8 inch diameter conduit and control valve.

Photo 8 Brick structure and 8 inch diameter conduit.

Photo 9 Low-level outlet and valvehouse.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS



INTERNATIONAL ENGINEERING CO DAREN, CONNECTICUT ENGINEER	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

DRAINAGE AREA MAP
SUCCESS LAKE DAM

YELLOW MILL CHANNEL BRIDGEPORT, CONNECTICUT

DWN BY	CKD BY	APP BY	SCALE 1"=2000'	
EAB	[illegible]	[illegible]	DATE APRIL 1981	SHEET D-1

HYDRAULIC / HYDROLOGIC INSPECTION

SUCCESS LAKE DAM, BRIDGEPORT, CT CT00079

I. PERFORMANCE AT PEAK FLOOD CONDITIONS

1. MAXIMUM PROBABLE FLOOD

a. WATERSHED CLASSIFIED AS "ROLLING"

b. WATERSHED AREA (D.A.) = 2.30 SQ. MI. *

* FROM IECO MEASUREMENTS ON THE BRIDGEPORT USGS QUADRANLE MAP, CT. FROM U.S. CORPS OF ENGINEERS (ACE) DATA, D.A IS 2.13 SQ. MI.

c. EXTRAPOLATING FROM NED-ACE GUIDE CURVES

$$PMF \cong 2080 \text{ CFS / SQ. MI.}$$

d. THEREFORE, PEAK INFLOW:

$$PMF = 2080 \times 2.3 \cong 4780 \text{ CFS}$$

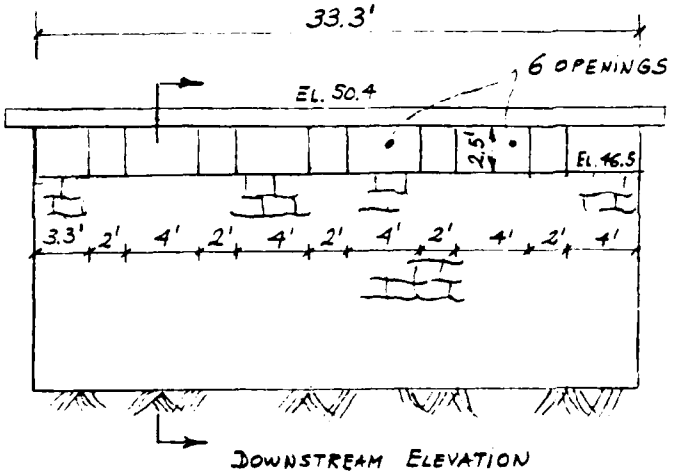
$$\tfrac{1}{2} PMF \cong 2390 \text{ CFS}$$

2. SURCHARGE AT PEAK INFLOWS (PMF AND 1/2 PMF).

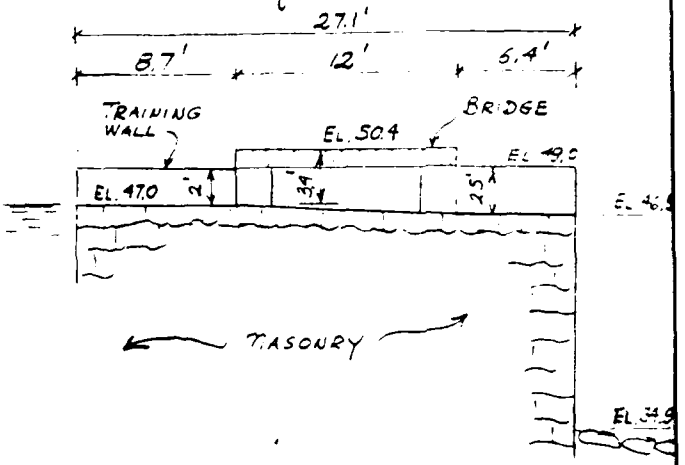
a. OUTFLOW RATING CURVE

i. SPILLWAY

THE MASONRY SPILLWAY IN THE MID-SECTION OF SUCCESS LAKE DAM IS A BROAD-CRESTED WEIR WITH A VERTICAL DOWNSTREAM FACE (SEE SKETCHES ON P. D-2).



DOWNSTREAM ELEVATION



CROSS-SECTION

THE 33.3-FT-WIDE AND 27.1-FT-LONG SPILLWAY HAS A CONCRETE ROAD BRIDGE WITH 6 OPENINGS THE FIVE OF WHICH HAVE A WIDTH OF 4 FT AND THE ONE OPENING ON THE RIGHT SIDE IS A 3.3-FT WIDE. THE HEIGHT OF THE OPENINGS IS 2 FT ON THE UPSTREAM BRIDGE EDGE AND 2.5 FT ON THE DOWNSTREAM EDGE. THE TOTAL LENGTH OF THE OPENINGS IS 23.3 FT (L_o) AND THE TOTAL AREA OF THE OPENINGS ON THE UPSTREAM SIDE IS 46.6 SQ. FT (A_o).

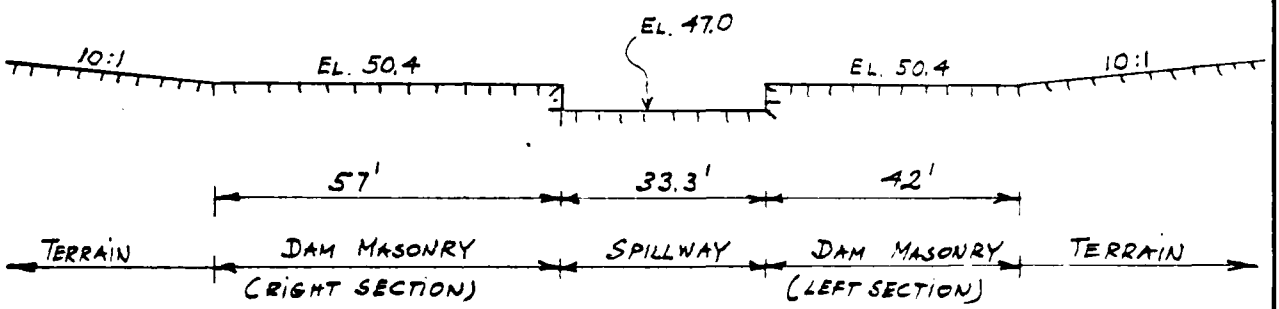
ASSUMING $C_1 = 2.2$ ($H < 2$ FT) AND $C_2 = 0.6$ ($H > 2$ FT) AND ADOPTING THE SPILLWAY CREST ELEV. 47.0 AS DATUM, THE SPILLWAY DISCHARGE IS APPROXIMATING BY :

$$Q_s = C_1 L_o H_1^{3/2} + C_2 A_o \sqrt{2g}\left(H_2 - \frac{3}{2}\right)^{\frac{1}{2}} = 2.2 \times 23.3 \times H_1^{3/2} + 0.6 \times 46.6 \times \sqrt{64.4}\left(H_2 - \frac{3}{2}\right)^{\frac{1}{2}}$$

$$\underline{Q_s = 51.3\, H_1^{3/2} + 224.4\left(H_2 - \frac{3}{2}\right)^{\frac{1}{2}}} \quad (\text{WHEN } H_1 < 2 \text{ FT}, \; H_2 = \tfrac{3}{2}\,; \; \text{WHEN } H_2 > 2, \; H_1 = 0)$$

ii. EXTENTION OF THE RATING CURVE FOR SURCHARGE OVERTOPPING THE DAM AND/OR ADJACENT TERRAIN

THE SUCCESS LAKE DAM IS A MASONRY STRUCTURE WITH A TOP ELEVATION OF 50.4 AND TOTAL LENGTH OF 99 FT. THE TERRAINS ADJACENT TO THE DAM HAVE SLOPES APPROXIMATELY 10:1 (SEE SKETCH BELOW).



DUE TO THE IRREGULARITIES IN THE PROFILE AN EQUIVALENT WEIR LENGTH MUST BE COMPUTED. ASSUMING A DISCHARGE COEFFICIENT C=2.3 AND ADOPTING THE SPILLWAY CREST AS DATUM (EL. 47.0), THE OVERFLOW CAN BE APPROXIMATED BY THE FOLLOWING EQUATIONS:

(1) TOP OF DAM AT EL. 50.4.

$$Q_D = 2.3 \times \frac{132.3}{99} \times (H_3 - 3.4)^{3/2} = 304.3\,(H_3 - 3.4)^{3/2}, \quad (H_3 > 3.4 \text{ FT})$$

(2) SLOPING TERRAIN TO THE LEFT AND RIGHT OF THE DAM:

$$L_S = \left(\tfrac{2}{5}\right) Z\,(H_3 - 3.4) = \left(\tfrac{2}{5}\right) 10\,(H_3 - 3.4) = 4\,(H_3 - 3.4)$$

∴ DISCHARGE OVER LEFT AND RIGHT TERRAINS

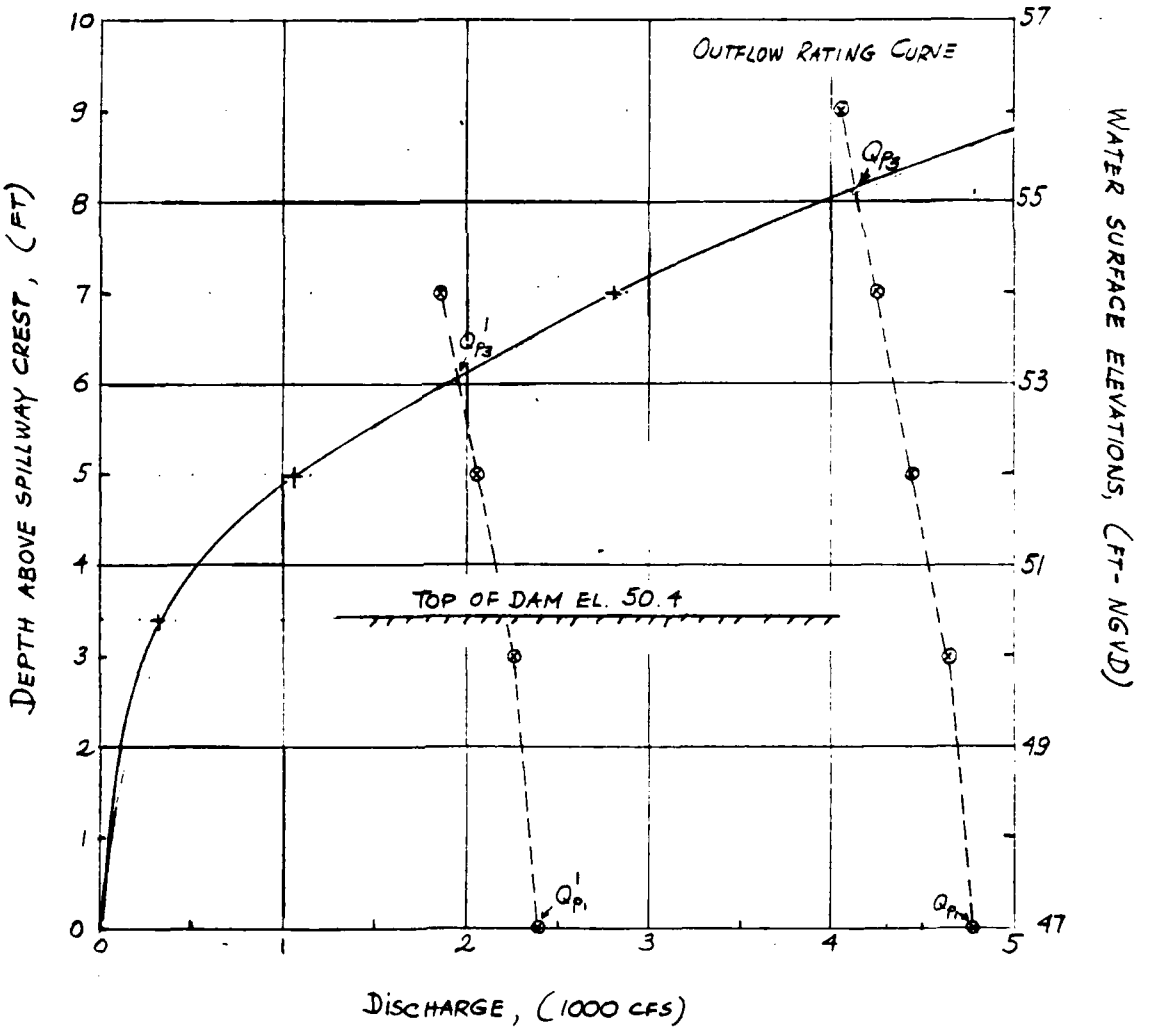
$$Q_S = 2 L_S\,(H_3 - 3.4)^{3/2} = 2 \times 4\,(H_3 - 3.4)^{5/2} = 8\,(H_3 - 3.4)^{5/2}$$

THEREFORE, THE TOTAL OUTFLOW RATING CURVE IS APPROXIMATED BY:

$$Q = 51.3\,H_1^{3/2} + 224.4\left(H_2 - \frac{3}{2}\right)^{1/2} + 304.3\,(H_3 - 3.4)^{3/2} + 8\,(H_3 - 3.4)^{5/2} \qquad H_3 \geq 3.4$$

WHEN $H_1 < 2$ FT, $H_2 = \frac{3}{2}$; WHEN $H_2 > 2$, $H_1 = 0$

THE RESULTING OUTFLOW RATING CURVE IS AS FOLLOWS:



b. SURCHARGE HEIGHT TO PASS PEAK INFLOWS (Q_{P_1} AND Q_{P_1}')

i. @ Q_{P_1} = 4780 CFS $\quad H_1 \cong 8.6$ FT

ii @ Q_{P_1}' = 2390 CFS $\quad H_1' \cong 6.6$ FT

C. EFFECT OF SURCHARGE STORAGE ON PEAK OUTFLOWS :

i. AVERAGE POND AREA WITHIN EXPECTED SURCHARGE :

(1) POND AREA AT FLOW LINE (EL. 47.0) $\quad A_{47}^{*} = 12.85$ AC

(2) POND AREA AT EL. 50.0 $\quad A_{50}^{*} = 30.3$ AC

(3) AREA AT CONTOUR 60.0 $\quad A_{60}^{*} = 68.8$ AC

* FROM IECO MEASUREMENTS ON THE BRIDGEPORT USGS QUADRANGLE MAP, CT

ASSUMING NORMAL POOL AT SPILLWAY CREST EL. 47.0, APPROXIMATING STAGE - STORAGE RATING CURVE WAS CONSTRUCTED (SEE P. D-6).

ii. DISCHARGE (Q_{P_2}) AT VARIOUS HYPOTHETICAL SURCHARGE ELEVATIONS :

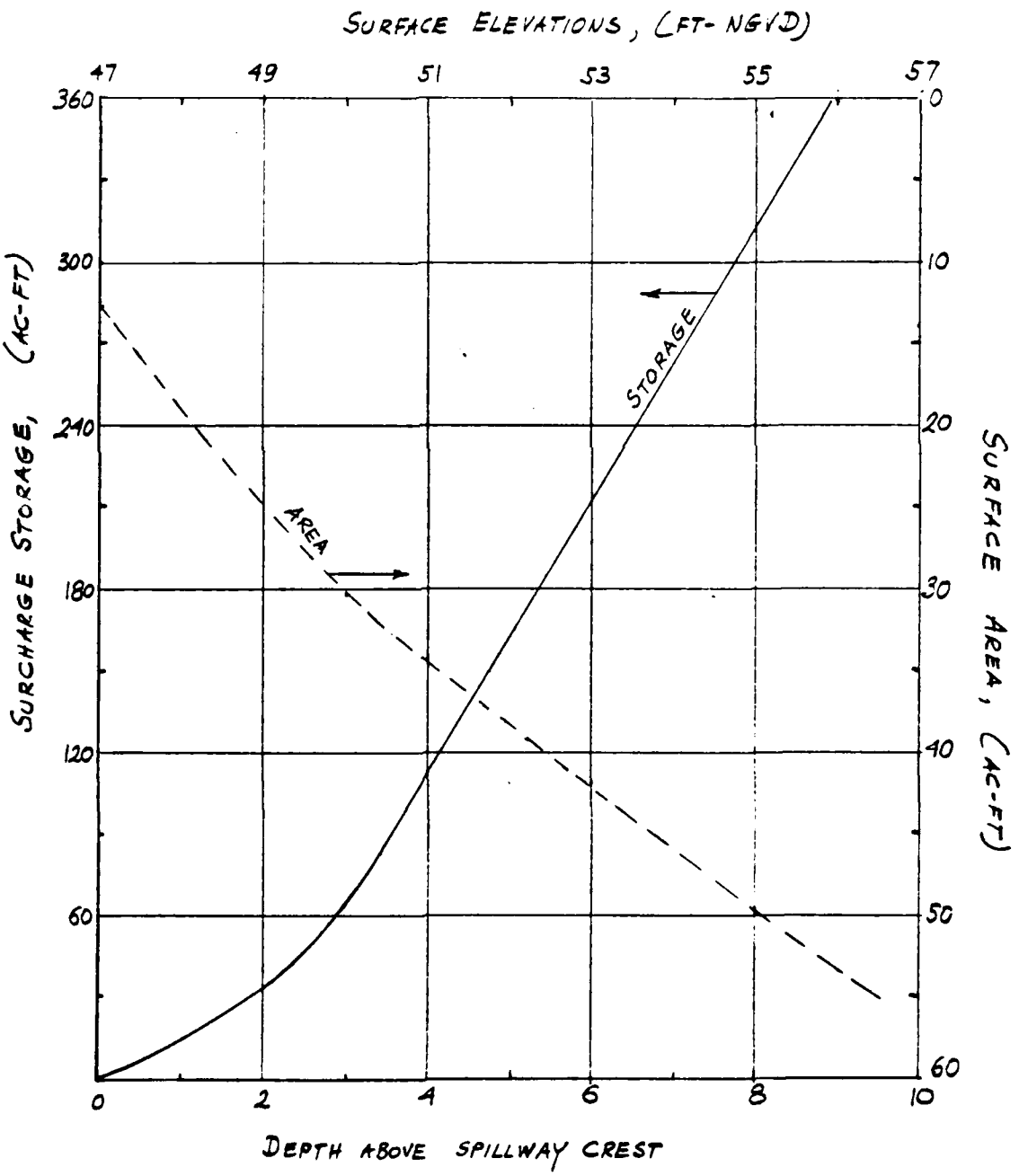
H = 9 FT, V = 362 AC-FT, $\therefore S = \frac{362}{2.3 \times 53.3} = 2.95$ IN

H = 7 FT; V = 262 AC-FT; S = 2.14 IN

H = 5 FT; V = 162 AC-FT; S = 1.32 IN

H = 3 FT; V = 65 AC-FT; S = 0.53 IN

STAGE - STORAGE AND STAGE - AREA CURVES



FROM APPROXIMATE ROUTING NED-ACE GUIDELINES AND 10 N MAXIMUM REASONABLE RUNOFF IN NEW ENGLAND:

$Q_{P_2} = Q_{P_1}\left(1 - \frac{S}{19}\right)$ AND FOR 1/2 PMF $Q'_{P_2} = Q'_{P_1}\left(1 - \frac{S}{9.5}\right)$

∴ FOR THE PREVIOUS HYPOTHETICAL SURCHARGES:

H = 9 FT; Q_{P_2} = 4038 CFS, Q'_{P_2} = 1648 CFS

H = 7 FT; Q_{P_2} = 4242 CFS, Q'_{P_2} = 1852 CFS

H = 5 FT; Q_{P_2} = 4448 CFS; Q'_{P_2} = 2058 CFS

H = 3 FT; Q_{P_2} = 4647 CFS; Q'_{P_2} = 2257 CFS

d. PEAK OUTFLOWS (Q_{P_3} AND Q'_{P_3}):

USING NED-ACE GUIDELINES "SURCHARGE STORAGE ROUTING" ALTERNATE METHOD AND RATING CURVE (SEE p. D-4):

Q_{P_3} = 4120 CFS H_3 = 8.1 FT

Q'_{P_3} = 1950 CFS H'_3 = 6.05 FT

3. SPILLWAY CAPACITY RATIO TO PEAK INFLOW AND OUTFLOW.

SPILLWAY CAPACITY TO TOP OF DAM (EL. 50.4) IS 309 CFS

% CAPACITY OF INFLOW PMF : 6

" OUTFLOW " : 8

" INFLOW 1/2 PMF : 13

" OUTFLOW " : 16

II. DOWNSTREAM FAILURE HAZARD

1. POTENTIAL IMPACT AREA

THE POTENTIAL IMPACT AREA IS LOCATED 3500 FT DOWNSTREAM FROM THE DAM

LARGE 5-STORY CONCRETE BUILDING

NEAR BOND STREET, HAS FIRST FLOOR ELEVATION ABOUT 20 FT ABOVE THE STREAMBED. THERE IS ALSO THE STATE ROUTE 1 BRIDGE LOCATED ABOUT 1/3 MILES DOWNSTREAM FROM THE DAM.

2. FAILURE OF SUCCESS LAKE DAM.

a. BREACH WIDTH

i. HEIGHT OF DAM:

TOP OF DAM EL. 50.4 ; DAM DOWNSTREAM TOE 34.9; $\therefore$ H = 15.5 FT

ii. DAM MID-HEIGHT EL. 42.7 (50.4 - 15.5/2 ≈ 42.7)

iii. APPROXIMATE MID-HEIGHT LENGTH: $\ell \approx 50$ FT* (SPILLWAY LENGTH IS NOT INCLUDED)

* FROM IECO DRAWINGS

iv. BREACH WIDTH (SEE NED-ACE DOWNSTREAM FAILURE GUIDELINES)

$W_b = 0.4\ \ell = 0.4 \times 50 = 20$ FT

b. PEAK FAILURE OUTFLOW (Q_{pi})

ASSUME SURCHARGE AT TOP OF DAM (EL. 50.4)

i. HEIGHT AT TIME OF FAILURE : $Y_o = 15.5$ FT

ii. SPILLWAY DISCHARGE AT TIME OF FAILURE : $Q_s = 309$ CFS

iii. BREACH OUTFLOW :

$$Q_b = 8/27\ W_b \sqrt{g}\ Y_o^{3/2} = 8/27 \times 20 \times \sqrt{32.2} \times 15.5^{3/2} = 2052 \text{ CFS}$$

IV. PEAK FAILURE OUTFLOW TO YELLOW MILL CHANNEL TRIBUTARY

$$Q_{p_1} = Q_s + Q_b = 309 + 2052 \cong 2360 \text{ CFS}$$

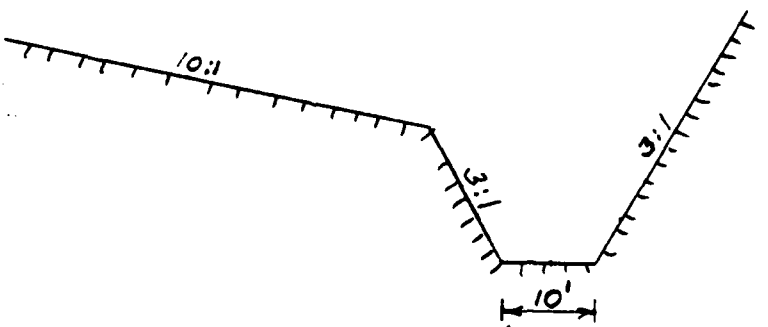
C. FLOOD DEPTH IMMEDIATELY DOWNSTREAM FROM DAM:

$$Y = 0.44\ Y_o = 0.44 \times 15.5 = 6.8 \text{ FT}$$

d. ESTIMATE OF DOWNSTREAM FAILURE CONDITIONS AT POTENTIAL IMPACT AREA (SEE NED-ACE GUIDELINES FOR ESTIMATING DOWNSTREAM FAILURE HYDROGRAPHS)

i. REACH OF YELLOW MILL CHANNEL TRIBUTARY BETWEEN DAM AND IMPACT AREA.

VARIES SIGNIFICANTLY IN SECTION. THE FIRST 1500-FOOT-LONG REACH IS APPROXIMATELY SHAPED AS SHOWN ON THE SKETCH BELOW:



CROSS SECTION REACH 1

THE AVERAGE SLOPE OF THE REACH IS 0.002 (±)

ii SUCCESS LAKE DAM RESERVOIR STORAGE AT TIME OF FAILURE.

STORAGE VOLUME BELOW SPILLWAY CREST APPROXIMATED BY 1/4 AH

$= 1/4 \times 12.85 \times 12.1 = 38.9$ AC-FT. SURCHARGE STORAGE TO THE OF THE DAM (EL. 50.4) IS 80.3 AC-FT (SEE STAGE-SURCHARGE CURVE ON p. D-6).

∴ MAXIMUM STORAGE VOLUME OF THE RESERVOIR IS $38.9 + 80.3 = 119.2$ AC-FT

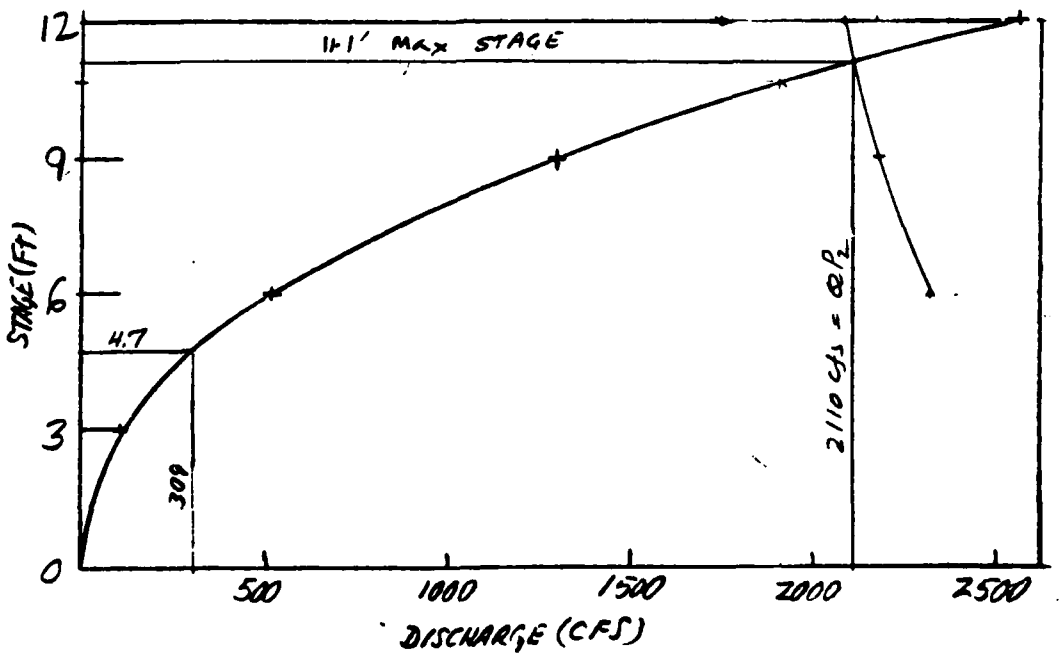
ASSUME $S_{MAX} = 119$ AC-FT

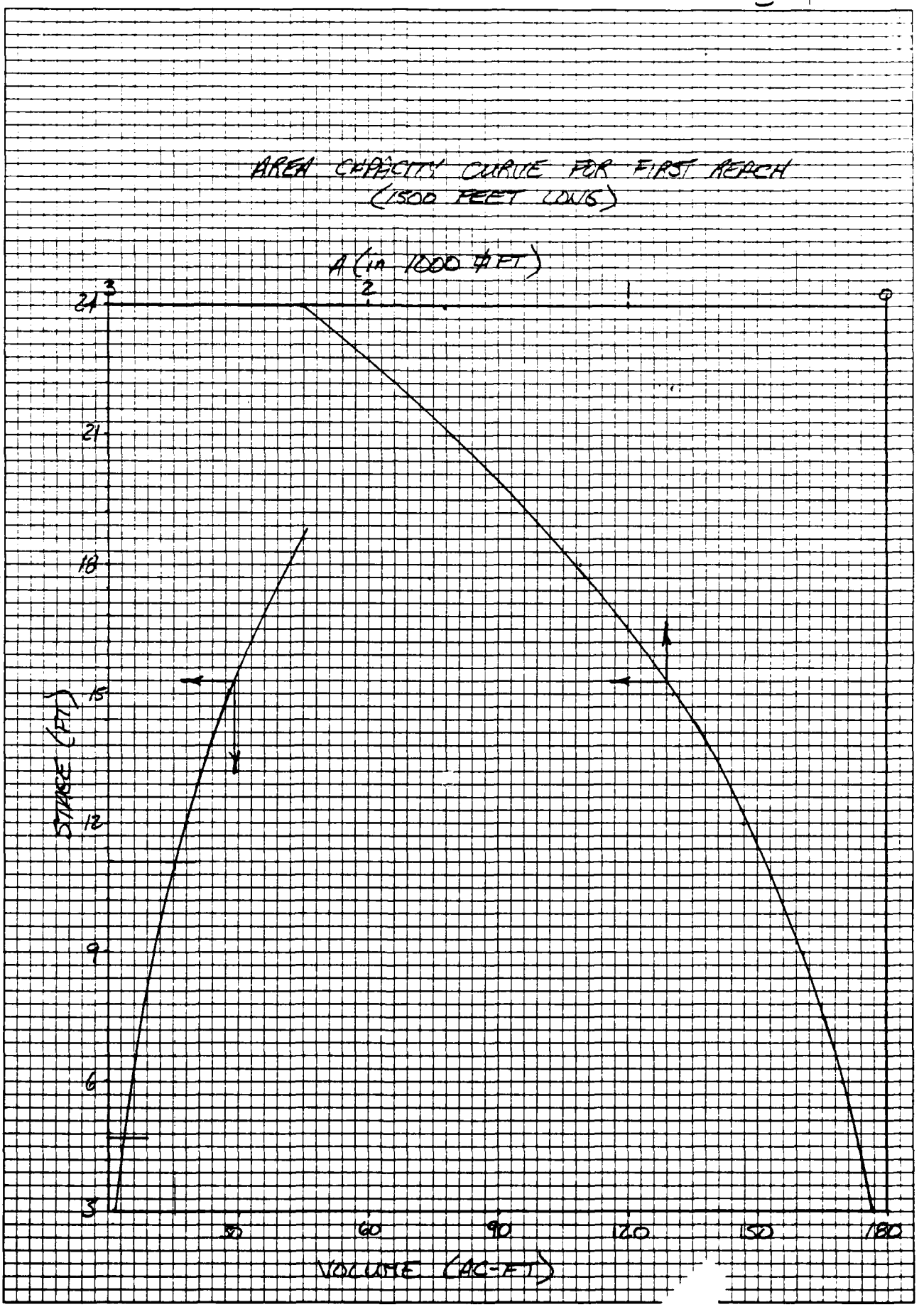
iii. PEAK INFLOW TO REACH: $Q_{p_1} = 2360$ CFS

iv. APPROXIMATE STAGE AT POTENTIAL IMPACT AREA FAILURE OF SUCCESS LAKE DAM

REACH $L = 3500$ FT; $n = 0.05$; $S = 0.002$; COMPUTED STAGE-DISCHARGE CURVE AND STAGE-AREA CURVE FOR THE BROOK SECTION AS SHOWN ON p.D-9 ARE PLOTTED ON p. D-11.

STAGE-DISCHARGE FOR CHANNEL-REACH 1





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11.5

PRE FAILURE STAGE 4.7FT DISCHARGE 309CFS

INITIAL VOLUME ABSTRACTED @ 4 AC-FT

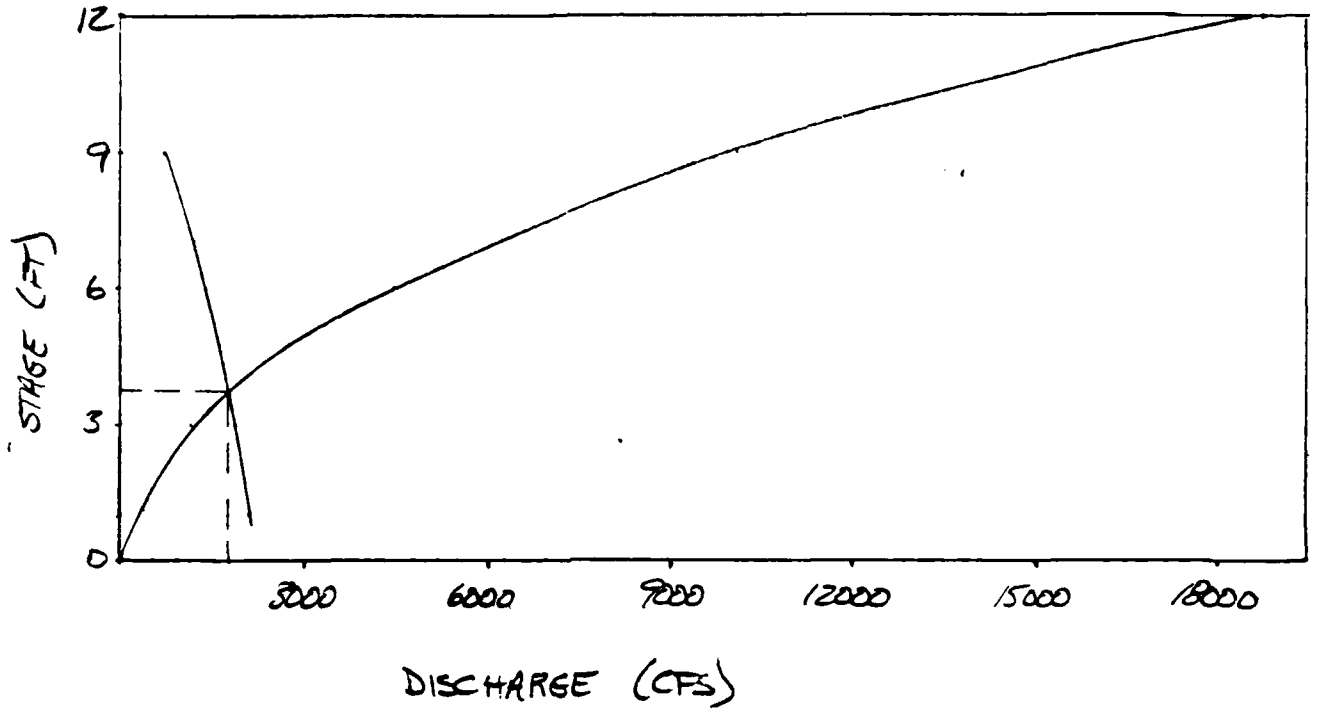
H	V	$Q_{P2} = 2360\left(1 - \frac{Vol-4}{119}\right)$
3	1.7	2406
6	6.0	2320
9	12.9	2183
12	18.1	2080

RISE IN STAGE 11.1 - 4.7 = 6.4'

Q_{P2} = 2110 CFS

REACH 2: L = 1400 FT n = 0.05 S = 0.002

STAGE DISCHARGE CURVE FOR REACH 2.



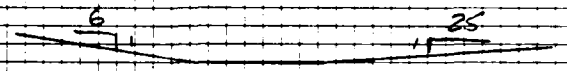
PRE FAILURE STAGE 1.0 FT DISCHARGE 309 CFS
INITIAL VOLUME ABSTRACTED V = 4.4 AC-FT
VOLUME ABSTRACTED BY REACH 1 ΔV_1 = 11.5 AC-FT
PLOTTING POINTS FOR GRAPHICAL ROUTING

$Q_{P_2} = 2110 \left(1 - \frac{VOL - 4.4}{119 - 115}\right)$

H	VOL	
1	4.4	2110
3	16.06	1881
6	41.07	1390
9	75.04	723

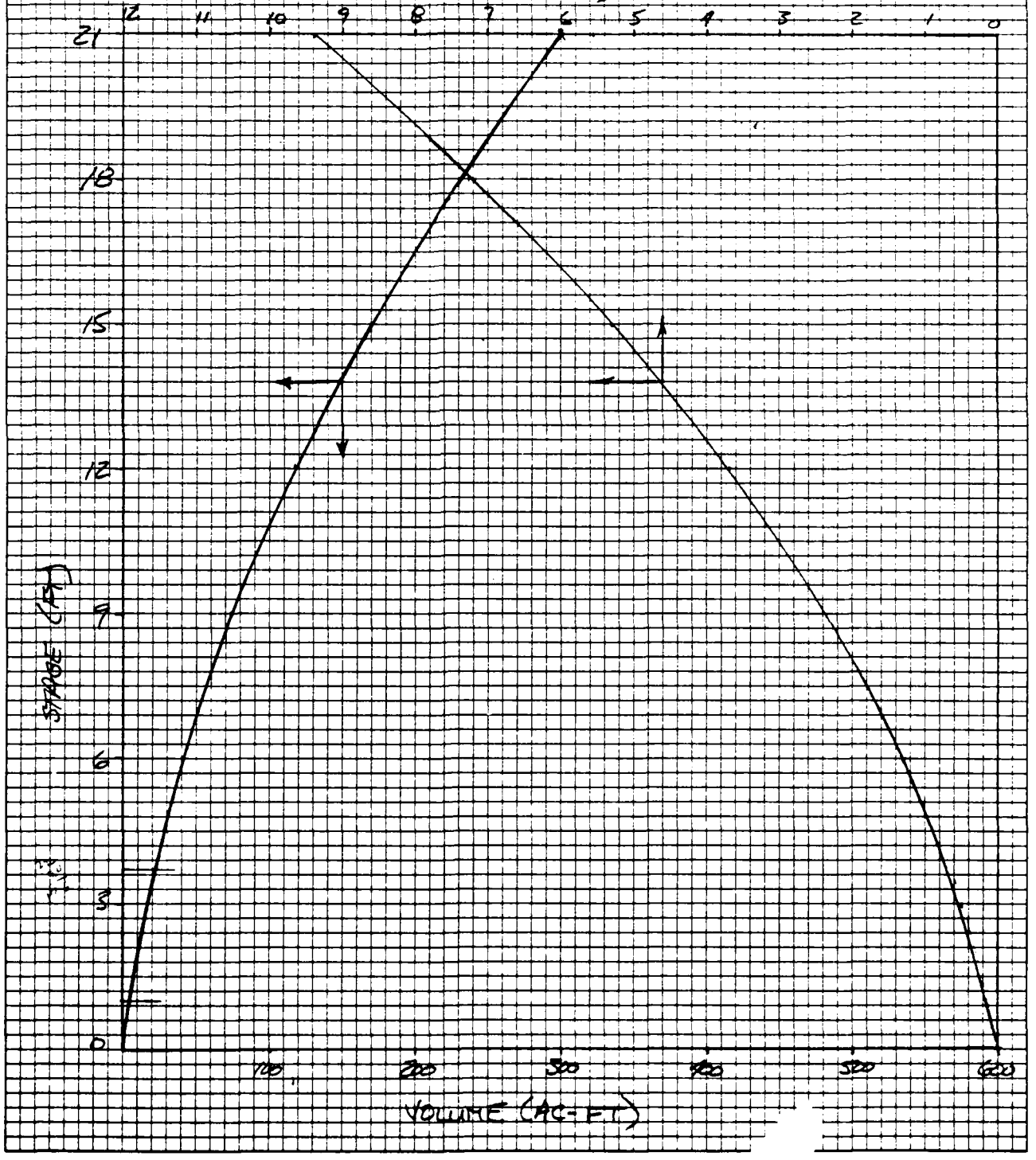
Q_{P_2} = 1800 cfs H = 3.7 FT ΔH = 2.7 FT

AREA CAPACITY CURVE FOR SECOND REACH
(1400 FEET LONG)

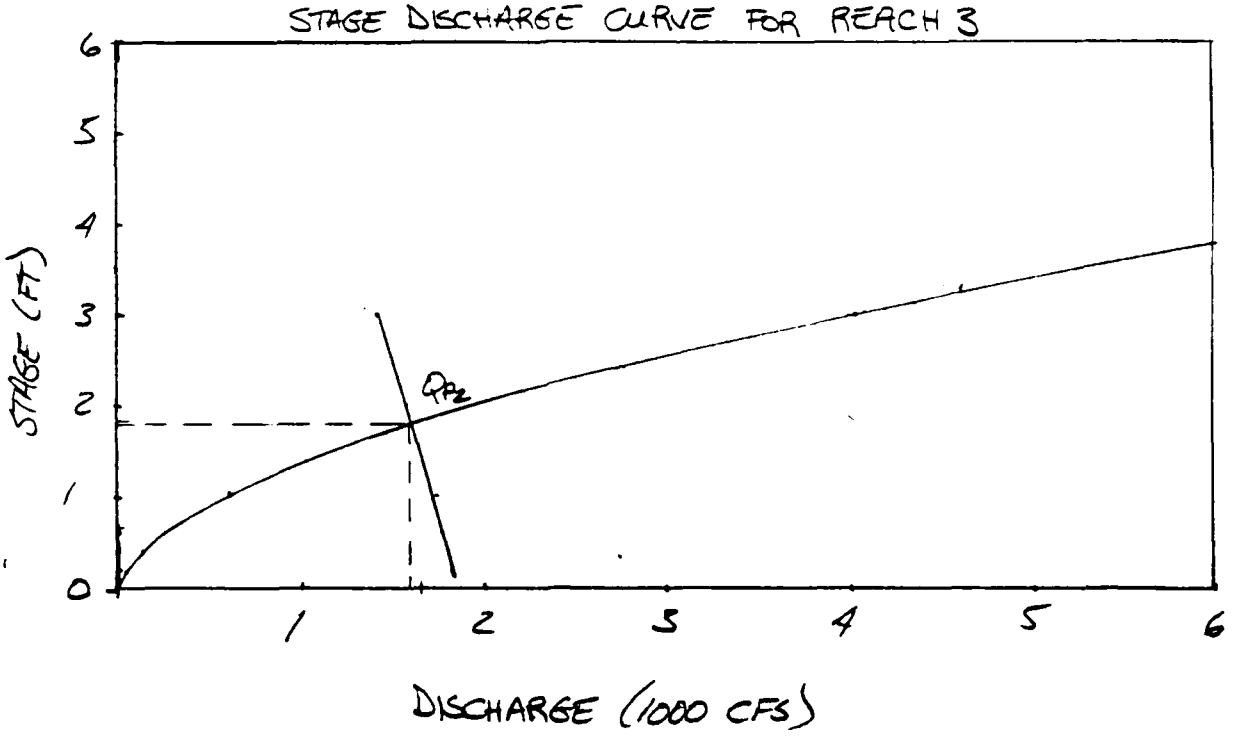


CHANNEL SECTION

AREA (1000 FT²)



REACH 3: $L = 600$ FT $n = 0.05$ $S = 0.002$

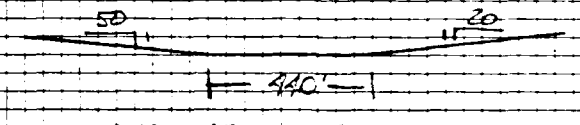


PREFAILURE STAGE ≈ 0.7 FT DISCHARGE 309 CFS

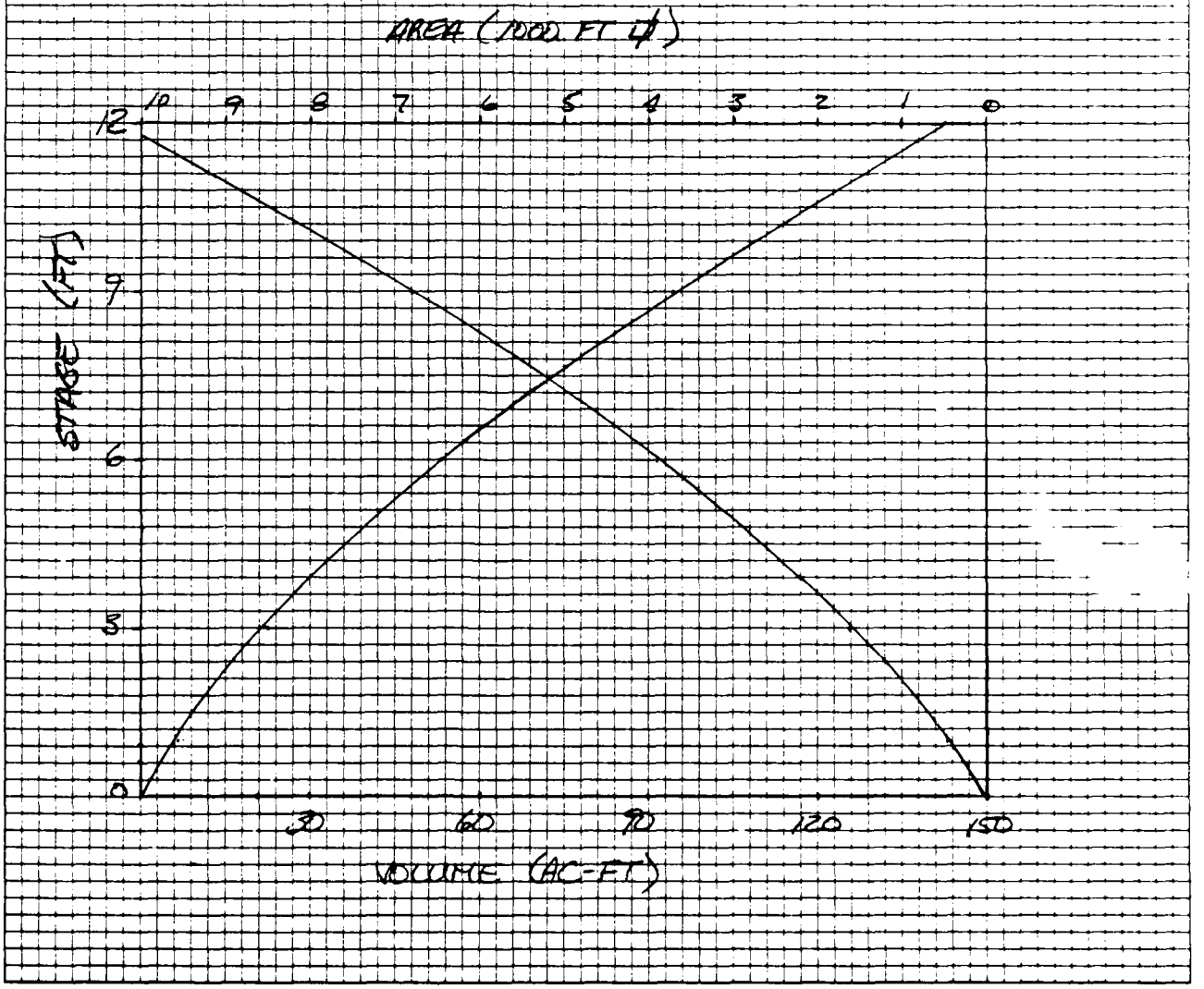
INITIAL VOLUME ABSTRACTED ≈ 3 AC-FT

H	VOL	$Q_{P_2} = 1800\left(1 - \frac{VOL-3}{119-17.5}\right)$
0.2	1.2	1836
0.6	3.8	1784
1.0	6.5	1730
1.4	9.4	1672
2.0	14.0	1580
3.0	22.5	1410

AREA CAPACITY CURVE FOR THIRD REACH (L = 600 FT.)



CHANNEL SECTION
THIRD REACH



Q_{P_2} = 1620 CFS H = 1.8 FT

RISE IN STAGE ΔH = 1.8 - 0.7 = 1.1 FT

III. THE RISE IN STAGE WITHIN THE FIRST REACH WILL NOT EFFECT THE STRUCTURE IMMEDIATELY D/S FROM THE DAM (1ST FLOOR EL ≈ 20 FT ABOVE STREAM BED) THE RISE IN STAGE WITHIN THE THIRD REACH WILL HAVE LITTLE OR NO EFFECT ON THE STRUCTURES NEAR THE STREAM.

END

FILMED

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